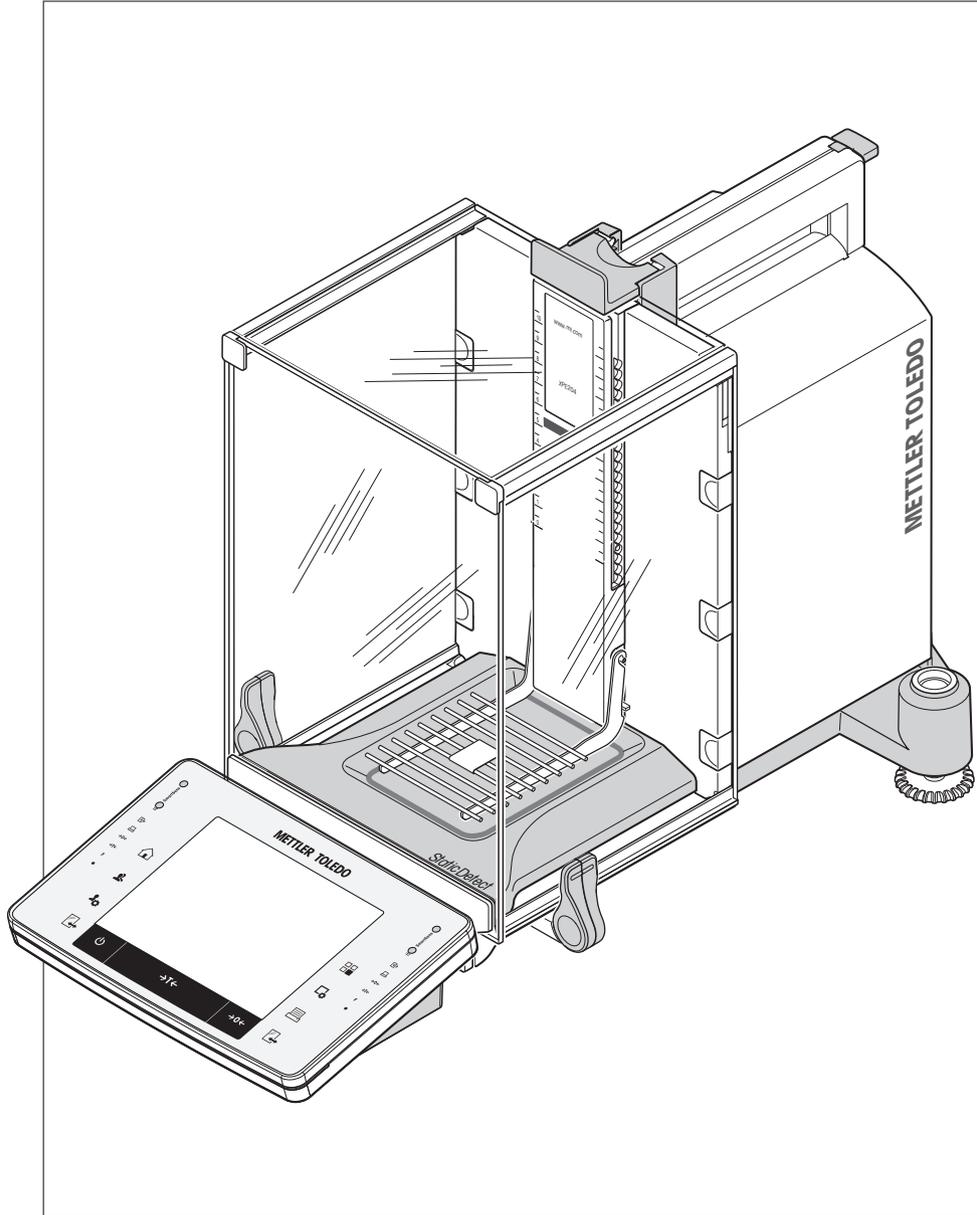


Excellence Analytical Balances

XPE Models



METTLER TOLEDO

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1 Introduction

Thank you for choosing a METTLER TOLEDO balance.

This balance offers numerous weighing and adjustment options with exceptional operating convenience.

METTLER TOLEDO is a leading manufacturer of balances for laboratory and production use as well as analytical measuring instruments. A globally present customer service network with highly trained personnel is always available to assist with the selection of accessories or provide advice on the optimal use of the balance.

Various models offering different performance features are available. Models offer different weighing ranges and resolutions. Special reference is made to these features in these instructions if important for operation.

All XPE line models offer the following features:

- StaticDetect for detection of electrostatic charges
- Glass draft shield with motorized opening for precise weighing even in unstable environments.
- Fully automatic adjustment "ProFACT" using internal weights.
- Built-in level sensor, illuminated level indicator and Leveling Assistant for fast and easy leveling.
- Built-in applications for normal weighing, statistics, formulation, piece numbers, percent weighing, density determination, differential weighing, pipette test and titration.
- Integral RS232C interface.
- Slot for second interface (optional).
- Touch-sensitive graphic terminal ("Touch screen") with color display and status indicator.
- Two programmable sensors for hands-off operation ("SmartSens") to speed up frequently recurring tasks.

The balance conforms to current standards and directives. It supports requirements, work techniques and protocols as specified by all international quality assurance systems, e.g. GLP (Good Laboratory Practice), GMP (Good Manufacturing Practice). The balance has a CE Declaration of Conformity and METTLER TOLEDO, as the manufacturer, is certified to ISO 9001 and ISO 14001. This provides the assurance that your capital investment is protected in the long term by high product quality and a comprehensive service package (repairs, maintenance, servicing, adjustment service).

Finding more information

► www.mt.com/excellence

Software version

These operating instructions refer to the originally installed firmware (software) version V 1.00.

1.1 The following conventions apply to these operating instructions

Key and button designations are shown in graphic or text form in square brackets (e.g. [L] or [Define]).

These symbols indicate an instruction:

- Requirements
- 1 Steps
- 2 ...
- ⇒ Results

2 Safety Information

2.1 Explanation of warnings and symbols

Safety notes are indicated by signal words and warning symbols and contain warnings and information about safety issues. Ignoring safety notes can lead to personal injury, damage to the instrument, malfunctions and erroneous results.

Signal words

WARNING	for a hazardous situation with medium risk, possibly resulting in severe injuries or death if not avoided.
CAUTION	for a hazardous situation with low risk, resulting in damage to the device or the property or in loss of data or minor or medium injuries if not avoided.
Attention	(no symbol) for important information about the product.
Note	(no symbol) for useful information about the product.

Warning symbols



General hazard



Electrical shock

Mandatory signs



Gloves must be worn

2.2 Product safety information

Intended use

Your balance is used for weighing. Use the balance exclusively for this purpose. Any other type of use and operation beyond the limits of technical specifications without written consent from Mettler-Toledo AG, is considered as not intended.



It is not permitted to use the instrument in explosive atmosphere of gases, steam, fog, dust and flammable dust (hazardous environments).

General safety information

This balance complies with current industry standards and the recognized safety regulations; however, it can constitute a hazard in use. Do not open the balance housing: The balance contains no user-serviceable parts. In the event of problems, please contact a METTLER TOLEDO representative.

Always operate and use your instrument only in accordance with the instructions contained in this manual. The instructions for setting up your new instrument must be strictly observed.

If the instrument is not used according to these Operating Instructions, protection of the instrument may be impaired and METTLER TOLEDO assumes no liability.

Staff safety

These operating instructions must be read and understood before using the balance. These operating instructions must be retained for future reference.

The balance must not be altered or modified in any way. Only use METTLER TOLEDO original spare parts and accessories.

Safety notes



WARNING

Risk of electric shock

Use only the original universal AC adapter delivered with your balance, and check that the voltage printed on it is the same as your local power supply voltage. Only plug the adapter into a socket which is grounded.



CAUTION

Damage to the balance

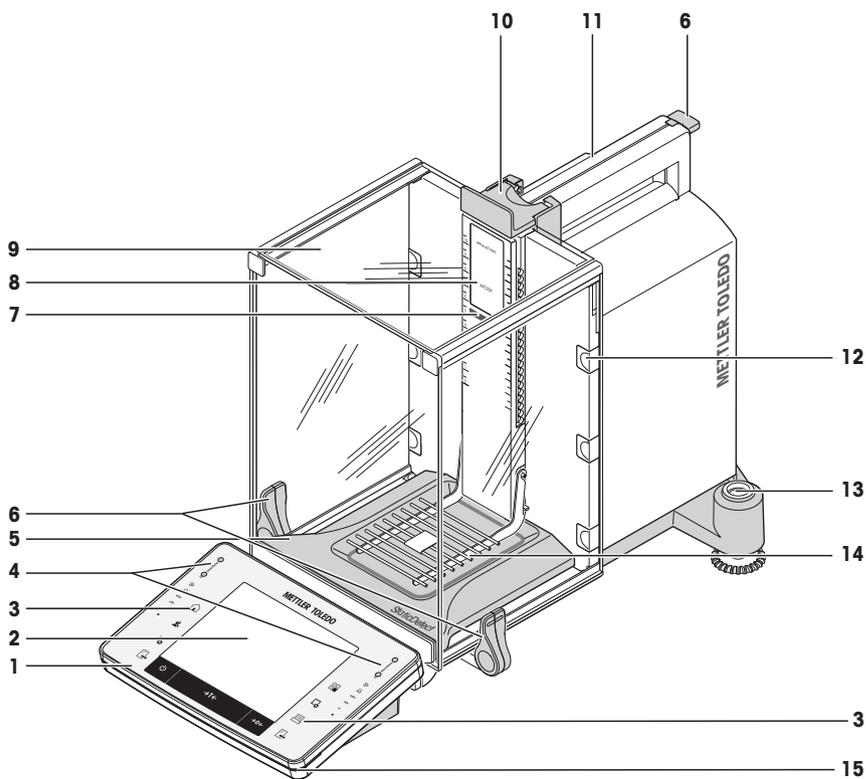
- a) Only use indoors in dry locations.
 - b) Do not use pointed objects to operate the keyboard!
The balance is of a very sturdy design, but is still a precision instrument. It must be handled with care.
 - c) Do not open the balance:
The balance contains no user-serviceable parts. In the event of problems, please contact a METTLER TOLEDO representative.
 - d) Only use METTLER TOLEDO original accessories and peripheral devices for the balance.
These are specifically designed for the balance.
-

3 Design and Function

This section describes the balance, operating and indicating elements of the terminal and the operating concept of the balance firmware.

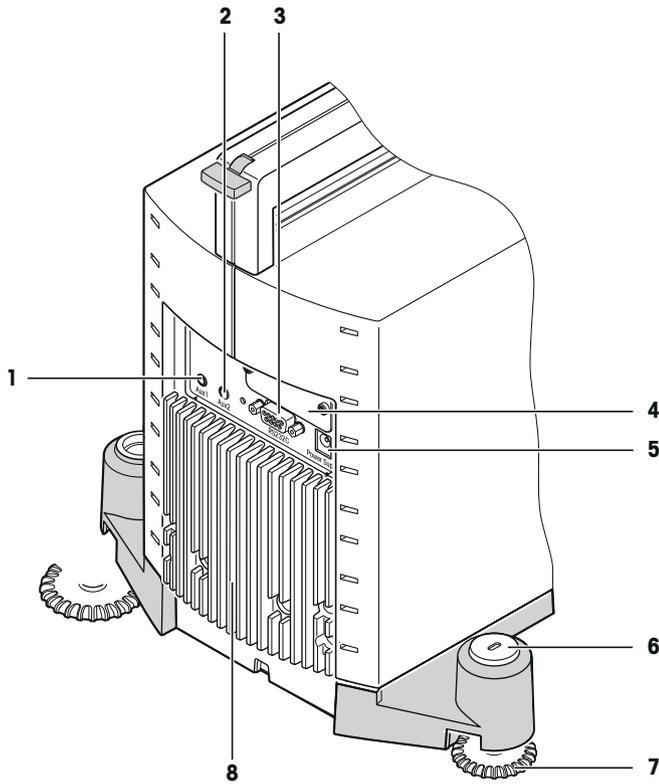
3.1 Overview

3.1.1 Balance



Front view

1	Terminal	2	Display
3	Operating keys	4	SmartSens sensors
5	StaticDetect drip tray for detection of electrostatic charges	6	Handle/coupling element for operation of the draft shield doors
7	StaticDetect light	8	Type designation
9	Glass draft shield	10	Handle for operation of the top draft shield door
11	Guide for top draft shield door and transport handle	12	Removable clips for feeding cables or hoses
13	Level indicator/Level sensor	14	SmartGrid weighing pan
15	Status indicator		

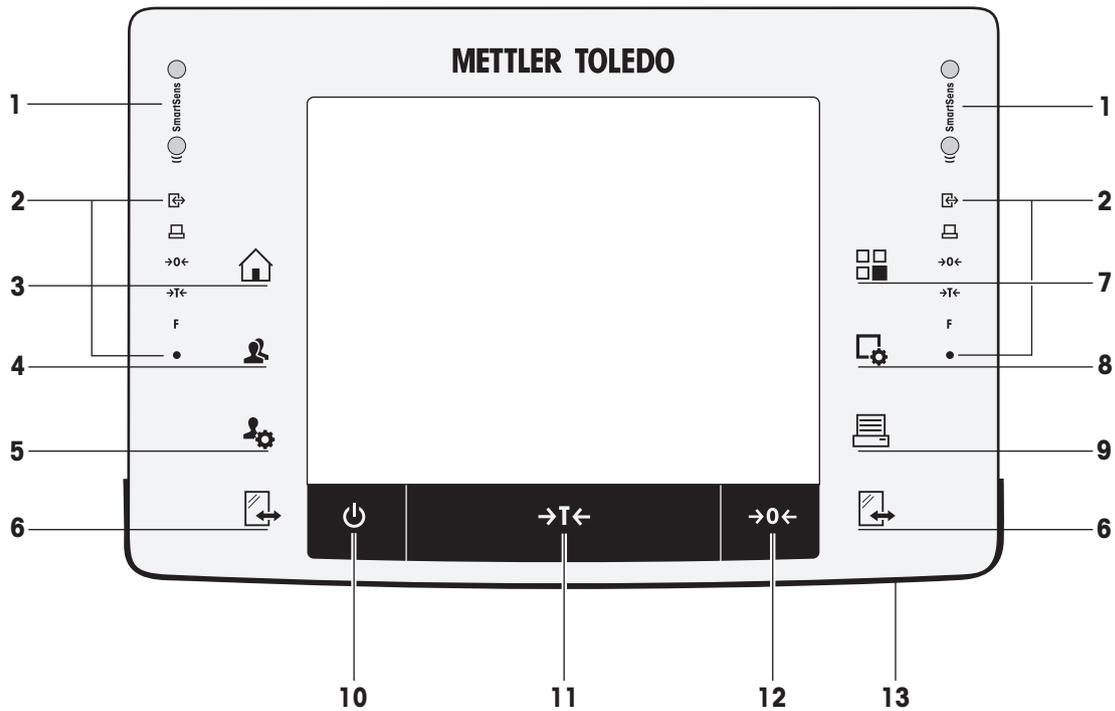


Rear

1	Aux 1 (connection for "ErgoSens", hand or foot switch)	2	Aux 2 (connection for "ErgoSens", hand or foot switch)
3	RS232C serial interface	4	Slot for second interface (optional)
5	Socket for AC adapter	6	Fastening point for anti-theft device
7	Foot screw	8	Cooling element (model dependent)

3.1.2 Terminal

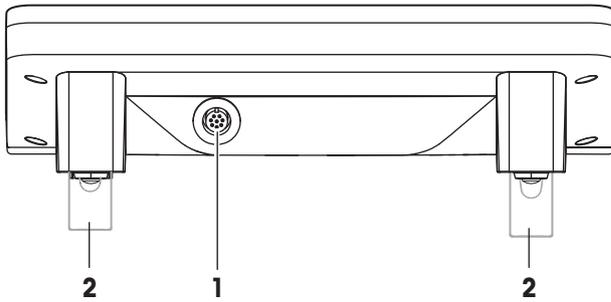
Key assignments and terminal connection.



Front view

		Designation	Explanation
1		SmartSens	Two hands-free sensors. Both of these hands-free sensors can be assigned a specific function (e.g. zeroing, printing or display resolution adjustment). See settings for SmartSens and ErgoSens in the respective applications. A specific function can be activated by moving the hand over the respective sensor (maximum distance about 5 cm). The sensor beeps to confirm that it has recognized the command.
2		Status bar	The green icons in the status bar indicate the functions assigned to the SmartSens left or SmartSens right . The F symbol represents a function key. SmartSens is deactivated when no green symbol is illuminated. The yellow LED at the bottom of the status bar lights up briefly when a key is selected or a menu function is initiated.
3		Home	This key is used to return to the user profile Home from any menu level in any application.
4		User profile	This key is used to display a specific user profile. Different settings can be saved in a user profile. This allows the balance to be adjusted to a specific user or weighing task.
5		Settings for user profiles	For defining basic settings for each user profile. These settings apply to all user applications.

6		Open/Close	For opening and closing the glass draft shield doors. For convenient right and left-handed operation, one of these keys is provided on both sides of the terminal.
7		Select application	This key is used to select a required application.
8		Configuration	For displaying menus for the configuration of a current application. The application can be adjusted to a specific task via numerous settings.
9		Print	This key is used to transfer data via the interface, e.g. to a printer. Other devices, e.g. a PC can also be connected. The data to be transferred can be freely defined.
10		On/Off	For switching the balance on and off (standby mode). Note It is recommended not to disconnect the balance from the power supply unless it is not going to be used for an extended period.
11		Tare	This key is used to tare the balance manually (only necessary for normal weighings). When the balance has been tared, the Net symbol is displayed to indicate that all displayed weights are net. Note A negative weight is not permitted. An error message is generated. When the stability detector icon extinguishes (small ring on the left of the weight display), a stable weight is indicated. The procedure for taring the balance is not the same as for zeroing.
12		Zeroing	This key is used for setting a new zero point manually (only required if the balance is used for normal weighings). After zeroing " Zeroing ", all weights (also the tare weight) apply to this new zero point and the following applies: tare weight = 0, net weight (= gross weight) = 0.
13		Status indicator	Indicates the current balance status. The status indicator shows that the balance is ready to use. Green = balance is ready to use. Flashing green = balance is busy. Example: Internal adjustment in progress. Yellow = task pending, balance can still be used. Example: Automatic internal adjustment pending. Red = balance cannot/must not be used. Example: Balance is not correctly leveled.



Rear

1	System connection (terminal cable)	2	Foot screw
----------	------------------------------------	----------	------------

3.2 User interface

3.2.1 Display

The illuminated, color display of the terminal is a touch screen, i.e. a touch-sensitive screen. It can be used for displaying data, entering settings and selecting functions by tapping the screen.

Note

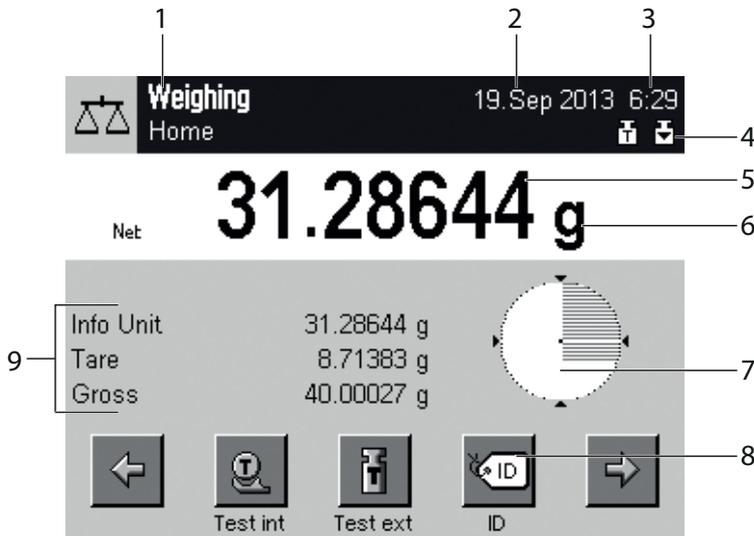
Depending on country-specific requirements, non-calibrated decimal places are highlighted on calibrated balances.



CAUTION

Do not touch the touch screen with pointed or sharp objects!

This may damage the touch screen.



	Designation	Explanation
1	Application name	Select application. The application menu can be selected by tapping this zone. The application can be selected here. This menu can also be displayed by pressing [F1].
	Current user profile	Displays the current user profile.
2	Date	The date can be changed by tapping this zone.
3	Time	The time can be changed by tapping this zone.

4	Status icons	These status icons indicate special balance statuses (e.g. service due, adjustment required, battery replacement). A separate selection window is displayed when the icons are tapped. When the icons are tapped, their functions are explained.
5	Weight value	Tapping the weight displays a window showing the result in a large format. This is useful for reading a weight from a certain distance.
6	Weighing unit	The required weighing unit can be changed by tapping the weighing unit, e.g. from mg to g .
7	SmartTrac	SmartTrac is a graphic weighing-in aid, which shows at a glance an already used and still available weighing range. Various display modes can be selected for SmartTrac or deactivated by tapping this area.
8	Function keys	This area is reserved for Function Keys enabling direct access to frequently required functions and application settings. If more than 5 function keys are activated, these can be selected with the arrow keys.
9	Information fields	This area is used for displaying additional information (information fields) relating to an active application. Tapping the information field enables Information fields and Function Keys to be displayed directly via menu selection. The leveling assistant can also be started.

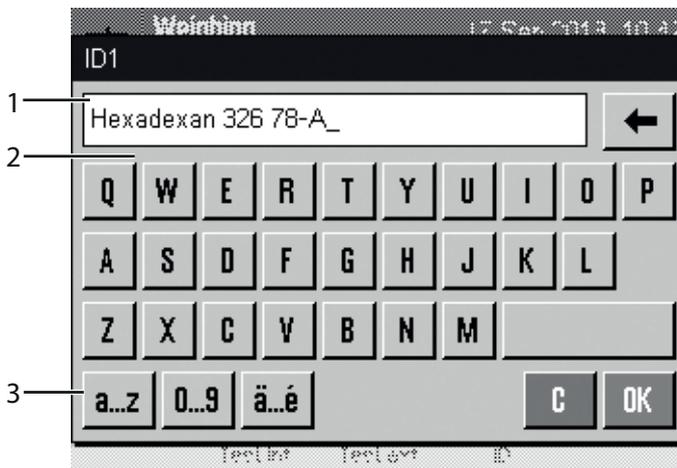
Screen saver

If the balance is not used for 15 minutes, the display is automatically dimmed and the pixels are inverted about every 15 seconds. When the balance is used again (e.g. load weight, press key), the display returns to a normal state.

3.2.2 Input dialog boxes

The keyboard dialog box is used to enter characters such as letters, numbers and special characters.

3.2.2.1 Text and number entry



	Designation	Explanation
1	Data field	Displays (entered) alphanumeric and numeric characters.
2	Keyboard	Data input area
3	Selection	Selects various keyboards.

- 1 Enter the designation.
- 2 Confirm with [OK].

	Function
←	Delete last character Tap once to place the cursor at the end of the data field.

3.2.3 Firmware

The firmware controls all balance functions. It enables the balance to be adjusted to a specific working environment.

The firmware is divided as follows:

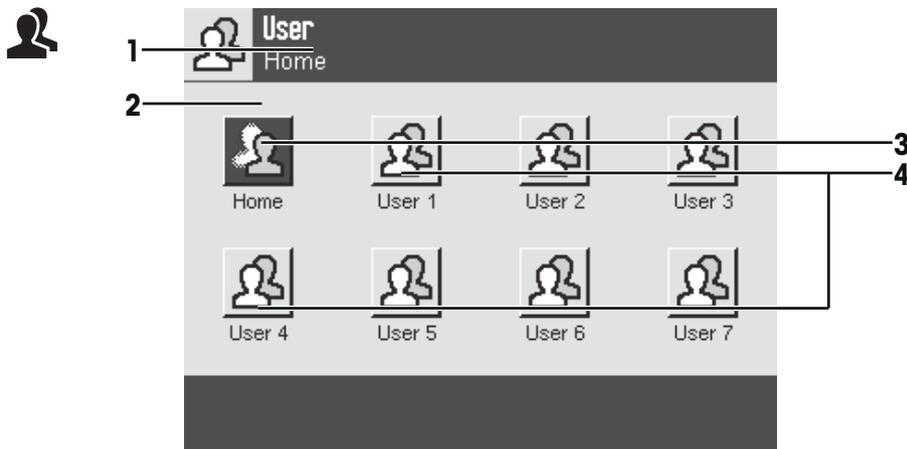
- User profiles
- User-specific settings
- Applications
- Application-specific settings
- System settings

Note

A displayed menu can be left at any time by repressing the same key as used for its selection.

3.2.3.1 User profiles

User profiles are used to adjust the balance to suit specific applications and personal work techniques or specific weighing tasks. A user profile is a collection of user defined settings that can be selected at the press of a button. The last active user profile is automatically loaded when the balance is switched on.

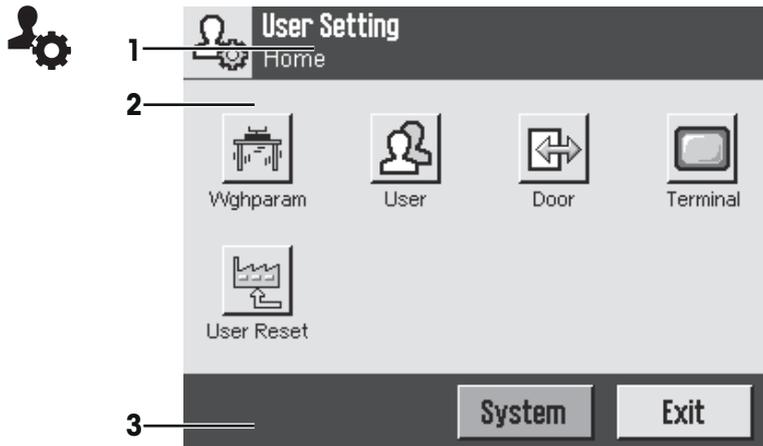


	Designation	Explanation
1	Title bar	The title bar displays elements for user orientation and information.
2	Contents area	The contents area is the main work area for menus and applications. The contents depend on the specific application or initiated action.
3	Home	The Home profile is a starting point that can be returned to at any time by pressing the [] key. It contains factory settings for all users. These settings can be changed as required. It is recommended not to change the Home profile factory settings, but make adjustments in further user profiles.
4	User profiles	Settings in further user profiles can be changed as required. All settings made in an active user profile are saved under this profile. This includes both application and user-specific settings. The system settings are not changed.

- A user profile can be changed by tapping the respective button.

3.2.3.2 User-specific settings

These settings can be used to adjust the balance to suit the tasks and work techniques of individual users. The settings can be defined separately for each user profile and for the **Home** profile. When a user profile is selected, the corresponding user-specific settings are automatically loaded.



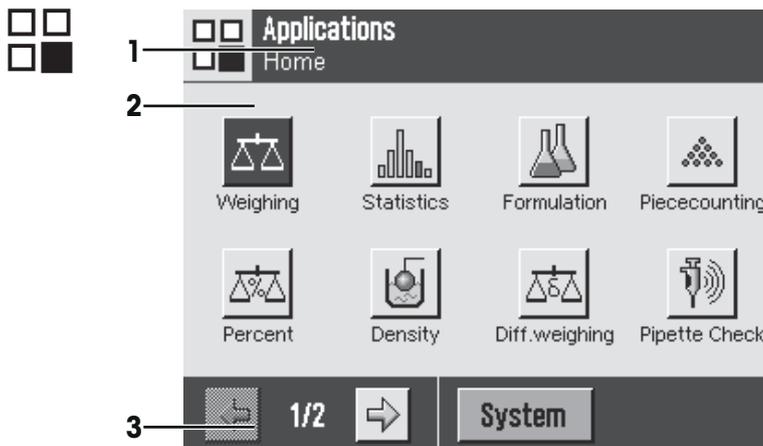
	Designation	Explanation
1	Title bar	The title bar displays elements for user orientation and information.
2	Contents area	The contents area is the main work area for menus and applications. The contents depend on the specific application or initiated action.
3	Action bar	The action bar contains action buttons for performing specific actions required in the active dialog box and are available (e.g. [Exit] , [STD] , [C] , [OK]).

- 1 Settings can be changed by tapping the respective button.
- 2 To leave the settings, select **[Exit]**.
- 3 To change the system settings, tap **[System]**.

	Function
Exit	Exit settings
System	Display system settings

3.2.3.3 Applications

Applications are firmware modules for performing specific weighing tasks. The balance is provided with various applications on delivery. After switching on the balance, the last active user profile and last used application are loaded. The applications are available under the  key. Instructions for working with standard applications are provided in the respective sections.



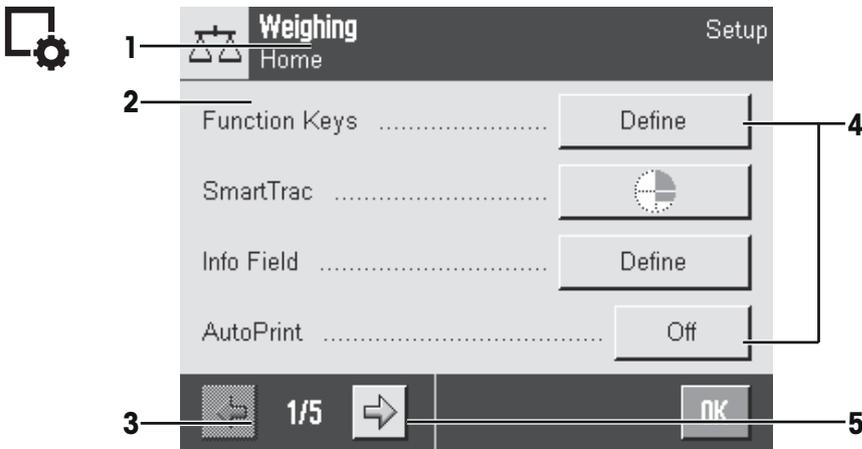
	Designation	Explanation
1	Title bar	The title bar displays elements for user orientation and information.
2	Contents area	The contents area is the main work area for menus and applications. The contents depend on the specific application or initiated action.
3	Action bar	The action bar contains action buttons for performing specific actions required in the active dialog box and are available (e.g. [Exit], [STD], [C], [OK]).

– An application can be selected by tapping the corresponding button.

	Function
System	Display system settings

3.2.3.4 Application-specific settings

These settings can be used to adjust the applications to suit individual user requirements. The available setting options depend on the selected application. Pressing [⚙️] opens the multipage menu with settings for a currently active application. Information on the individual setting options is provided in the section relating to the respective application. Settings can be defined separately for each user profile and for the **Home** profile. When a user profile is selected, the corresponding application-specific settings are automatically loaded.



	Designation	Explanation
1	Title bar	The title bar displays elements for user orientation and information.
2	Contents area	The contents area is the main work area for menus and applications. The contents depend on the specific application or initiated action.
3	Action bar	The action bar contains action buttons for performing specific actions required in the active dialog box and are available (e.g. [Exit], [STD], [C], [OK]).
4	Button	Edit/Select settings (e.g. [Define], [On], [Off]). The contents depend on the application.
5	Arrow	The arrow buttons are used to page forward or back.

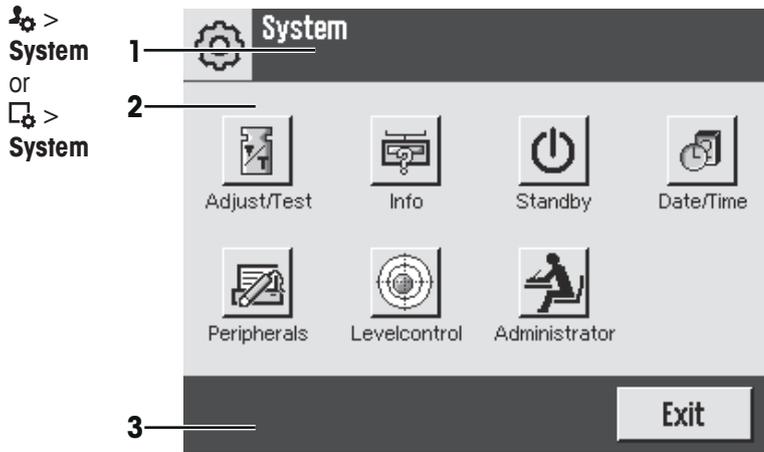
1 Settings can be changed by tapping the respective button.

2 Confirm with [OK].

	Function
➔	Page forward
➔	Page back

3.2.3.5 System settings

System settings (e.g. settings for peripheral devices) are independent of the user profiles and applications and apply to the entire weighing system. System settings can be displayed by pressing [⚙️] or [⚙️] and then the [System] button.



	Designation	Explanation
1	Title bar	The title bar displays elements for user orientation and information.
2	Contents area	The contents area is the main work area for menus and applications. The contents depend on the specific application or initiated action.
3	Action bar	The action bar contains action buttons for performing specific actions required in the active dialog box and are available (e.g. [Exit], [STD], [C], [OK]).

- 1 Settings can be changed by tapping the respective button.
- 2 To leave the settings, tap [Exit].

3.2.4 Security system

The balance has a comprehensive security system with which individual access rights can be defined at administrator and user level. Settings that may be changed can be defined for each individual user profile. Access to protected menu areas requires the entry of identification (ID) and a password. On delivery of the balance, only the [Administrator] settings in the system settings are protected.

When an ID and password protected menu area is selected, an alphanumeric keyboard is initially displayed for entry of the ID.



CAUTION

Remember IDs and passwords!

- Protected menu areas cannot be accessed without ID or password.
- Note IDs and passwords and keep them in a safe place.

- 1 Enter your ID.
 - Case sensitive, tap the [a...z] and [A...Z] button to switch between upper and lower case.
 - To enter numbers, tap the [0...9] button.
 - Incorrect entries can be deleted character by character with the arrow key .
- Note**
Entry can be interrupted at any time by tapping [C].
- 2 After entering the full ID, tap [OK].
 - ⇒ A further dialog box is displayed for entering the password.
- 3 Enter the password (for security reasons, this is displayed with asterisks instead of plain text) and confirm with [OK].
 - ⇒ If the ID and password are correct, the selected menu area is displayed or the required action initiated. If these are incorrect, an error message is displayed with a request to enter them again.

4 Installation and Putting into Operation

4.1 Unpacking

Open the balance packaging. Check the balance for transport damage. Immediately inform a METTLER TOLEDO representative in the event of complaints or missing accessories.

Note

Retain all parts of the packaging. This packaging offers the best possible protection for transporting the balance.

- Use the lifting strap to lift the balance out of the packaging box.

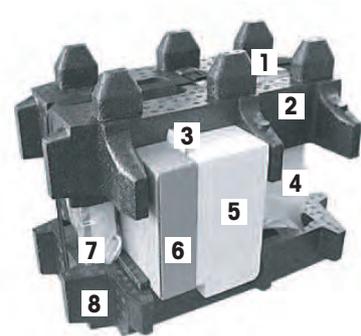
Overview

- 1 Lifting strap
- 2 Top packaging
- 3 Operating instructions and other important documents
- 4 Balance
- 5 Set with draft-shield doors and terminal support
- 6 Set with AC adapter, power supply cable, drip tray, SmartGrid, SmartGrid cover, SmartPrep single-use funnel and ErgoClip "Basket" (basket for small weighing objects).
- 7 Terminal

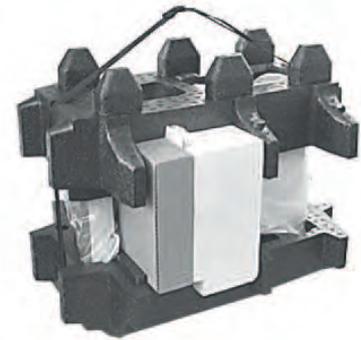
Note

The terminal is connected to the balance with a cable!

- 8 Bottom packaging



- 1 Remove the lifting strap (1).
- 2 Remove the top packaging (2).



- 1 Remove the operating instructions (3).
- 2 Remove the set with AC adapter (6).
- 3 Remove the set with draft shield doors (5).



- 1 Carefully remove the terminal from the bottom packaging.
- 2 Remove the protective cover.

Note

Since the terminal is connected to the balance with a cable, only withdraw the balance slightly from the packaging in order to remove the protective cover.



- 1 Place the terminal at the front of the balance.
- 2 Hold the balance by the guide or handle. Hold the terminal firmly with the other hand. Pull out both components together from the bottom packaging.



- 1 Place the balance with the terminal at the site of use.
- 2 Remove the cover from the balance.
- 3 Remove the transport protection (9) of the weighing pan support.



4.2 Scope of delivery

Check the delivery for completeness. The following accessories are part of the standard equipment of the balance:

- Balance with terminal
 - RS232C interface
 - Slot for second interface (optional)
 - Feedthroughs for below-the-balance weighing and for antitheft device
- Set with draft-shield doors and terminal support
- SmartGrid
- SmartGrid cover, chromium-nickel steel
- SmartPrep single-use funnel (2 pieces)
- Drip tray
- AC adapter with country-specific power cable
- Protective cover for the terminal

- Cleaning brush
- ErgoClip "Basket" (basket for small weighing objects)
- Production certificate
- CE declaration of conformity
- Operating instructions or Quick Start Guide; printed or on CD-ROM, depending on country of use

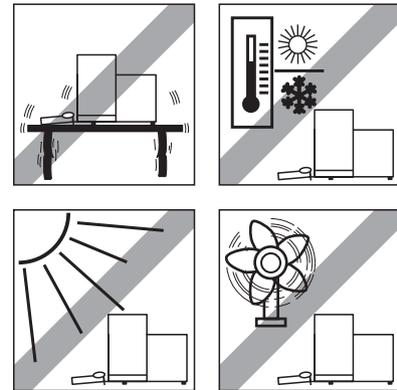
4.3 Location

An optimal location will ensure accurate and reliable operation of the balance. The surface must be able to safely take the weight of the balance when fully loaded. The following local conditions must be observed:

Note

If the balance is not horizontal at the outset, it must be leveled during commissioning.

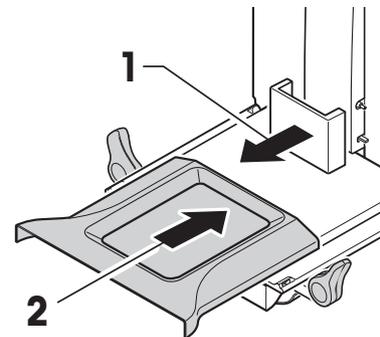
- The balance must only be used indoors and up to a maximum altitude of 4,000 m above sea level.
- Before switching on the balance, wait until all parts are at room temperature (+5 to 40°C).
The humidity must be between 10% and 80% non-condensing.
- The power plug must be accessible at all times.
- Firm, horizontal and vibration-free location.
- Avoid direct sunlight.
- No excessive temperature fluctuations.
- No strong drafts.



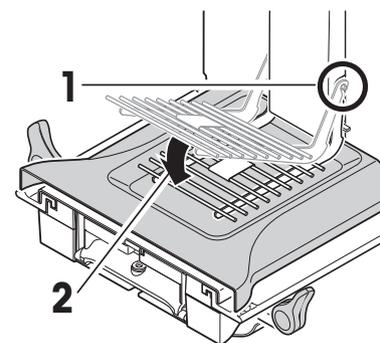
Further information can be found in Weighing the Right Way.

4.4 Assembling the balance

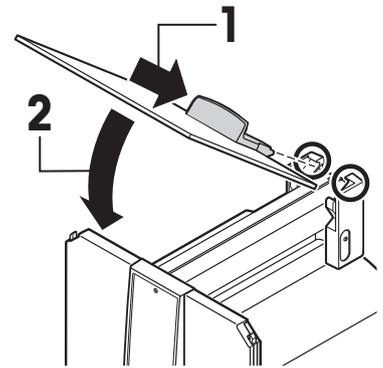
- 1 Remove the transport protection (1).
- 2 Insert the StaticDetect drip tray (2).
Insert the tray from the front above the bottom plate up to the partition.



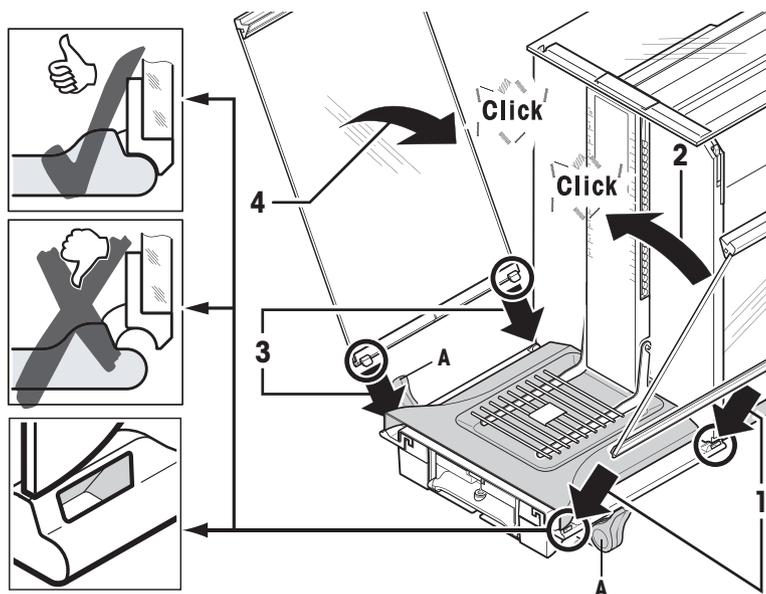
- 1 Insert the SmartGrid from the front.
- 2 Check that the SmartGrid (1) (2) is correctly hooked in on both sides.



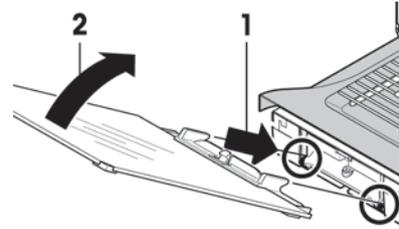
- 1 Insert the top draft shield door (1) at an angle (slightly below 30 degrees) into the **rear** guide.
- 2 Carefully fold the draft shield door (2) downwards, **see** figure.



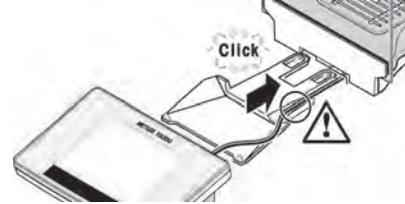
- ▶ The handles (A) must be folded outwards to mount the side draft shield doors.
- 1 Mount the draft shield side doors according to the following instructions, **see** figure below.
 - 2 Mount the side doors at an angle of about 30° in the 2 openings, **see** following figure.
 - 3 Check that the side doors are correctly mounted as described.
 - 4 Mount the side door so that it clicks in place in the balance. The side door will move easily when correctly mounted.
 - 5 Fold the handle of the side draft shield door inwards.
 - 6 Mount the second draft shield side door. The procedure is identical.
 - 7 Move the side doors fully back.



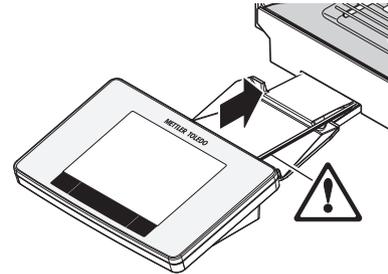
- 1 Fit the front draft shield glass (2).
Insert the glass at an angle into the bottom of the balance at the front until the two hooks of the front draft shield glass rest on the rollers (1).
- 2 Move the front draft shield glass upwards until it engages.



- 1 Insert the terminal support.
- 2 Place the cable in the guide of the terminal support.
- 3 Insert the terminal support into the opening in the front draft shield glass.
⇒ The terminal support must engage with a click.



- 1 Mount the terminal.
- 2 Place the terminal in the center of the support.
- 3 Push the terminal against the balance until it folds down easily at the front of the terminal support.
- 4 Insert the cable into the balance.



Attention

The balance and terminal are not connected by the terminal support! Always hold the balance and terminal firmly during transport.

Note

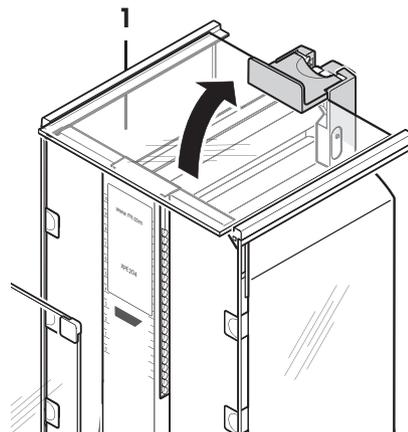
The terminal can also be placed in the area of the balance without the terminal support if the cable is of sufficient length.

4.5 Draft shield intermediate shelf

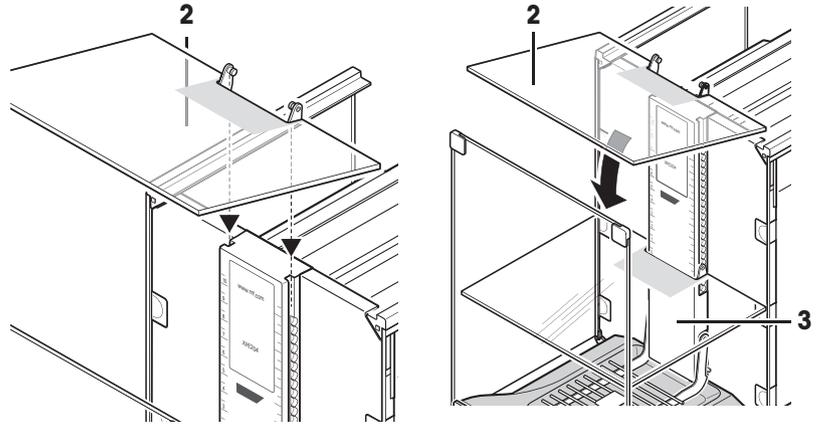
The weighing chamber volume can be reduced with the optional intermediate shelf. This enables the balance to indicate weights more quickly. It is also possible to acclimatize the material on the intermediate shelf.

Inserting the intermediate shelf

- 1 Open all draft shield doors.
- 2 Lift the top draft shield door (1) at the front and remove from the guide.
- 3 Place the top draft shield door on a clean surface.



- 1 Guide the intermediate shelf (2) from above into the guides of the middle guide rail.
- 2 Position the intermediate shelf at the required height (3).
- 3 Mount the top draft shield door (1). **See** Assembling the balance (page 26).



4.6 Connecting the balance



WARNING

Risk of electric shock

- a) To connect the balance, only use the supplied three-core power cord with equipment grounding conductor.
- b) Only connect the balance to a three-pin power socket with earthing contact.
- c) Only standardized extension cable with equipment grounding conductor must be used for operation of the balance.
- d) Intentional disconnection of the equipment grounding conductor is forbidden.

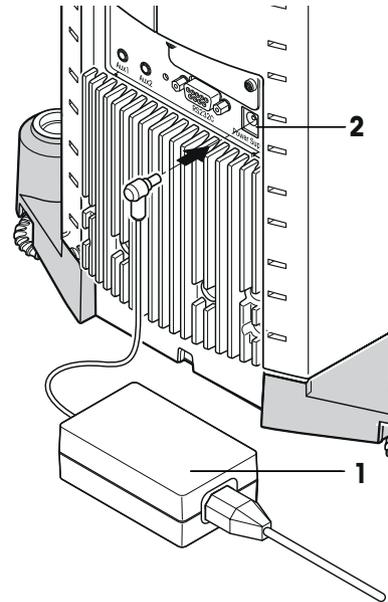
The balance is supplied with an AC adapter and country-specific power cord. The AC adapter is suitable for use with the following voltage range:

100 – 240 V AC, 50/60 Hz.

Attention

- Check whether your local power supply falls within this range. If this is not the case, under no circumstances connect the AC adapter to the power supply, but contact a METTLER TOLEDO representative.
- The power plug must be accessible at all times.
- Prior to use, check the power cord for damage.
- Route the cable in such a way that it cannot be damaged or cause a hindrance when working.
- Ensure that no liquid comes into contact with the AC adapter.

- ▶ Balance and terminal are at the final location.
- 1 Connect the AC adapter (1) to the connection socket (2) at the rear of the balance.
- 2 Connect the AC adapter (1) to the power supply.
- ⇒ The balance performs a self-test after connection to the power supply and is then ready to use.



4.7 Setting up the balance

4.7.1 Weighing for the first time

After commissioning the new balance, the first weighing can be carried out. This will also familiarize you with the operation of the balance.

If the balance is not aligned exactly horizontal, a warning text is generated after switching on the balance with the request to level the balance.

4.7.1.1 Switching on the balance

Startup

- ▶ Balance is connected to the power supply.
- ▶ Terminal and balance are interconnected.
- Press [⏻].
 - ⇒ Display appears.
 - ⇒ Balance is ready to use.

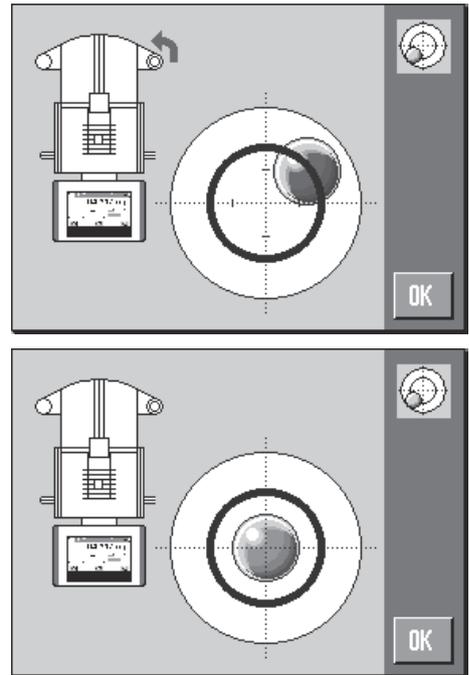
4.7.1.2 Leveling the balance

The balance has a built-in level sensor which permanently monitors correct horizontal alignment.

If the level sensor detects incorrect leveling, the status indicator at the terminal shows red. A warning text is displayed and an audible warning generated. A status icon also appears in the top right corner of the display.



- 1 To start the leveling assistant, tap [**LevelGuide**] in the warning message.
 - ⇒ Window with level indicator is displayed in real-time.
- 2 Observe the level indicator on the screen.
 - ⇒ The air bubble in the level indicator shows red with incorrect alignment.
 - ⇒ The leveling assistant indicates with red arrows the direction in which the two foot screws at the rear of the balance must be turned.
- 3 Turn the foot screw until the air bubble is located in the inner circle of the level indicator.
 - ⇒ The air bubble in the level indicator shows green with correct alignment.
 - ⇒ The status indicator at the terminal shows green.
- 4 Tap [**OK**].
 - ⇒ A message recommending adjustment of the balance is displayed.
- 5 Tap [**Adjust.int**] to adjust the balance.



4.7.1.3 Performing a simple weighing

To perform a simple weighing, only the keys in the lower part of the terminal are required. The balance has separate keys for zeroing [**→0←**] and taring [**→T←**].

Zeroing

- Press [**→0←**].
- ⇒ Zeroing

After zeroing, all weights (also the tare weight) apply to this new zero point and the following apply: tare weight = 0, net weight (= gross weight) = 0.

Taring

Note

A negative weight is not permitted. An error message is generated. When the stability detector icon extinguishes (small ring left of the weight display), the indication is stable. The weight is displayed.

- ▶ If a weighing container is used, the balance must first be set to zero.

- 1 Place the container on the balance.
- 2 Press [**→T←**].
 - ⇒ The balance is tared.
 - ⇒ The weight of the container is set as the new tare weight and the previous tare (if available) is overwritten.
 - ⇒ The **Net** display signals that all indicated weights are net weights.

Congratulations!

The first weighing is now complete. The following sections contain further information about the extensive functions and applications of this balance.

4.7.2 Operating the glass draft shield

The draft shield of the balance can be adjusted to the ambient conditions, weighing method and material to be weighed.

The glass draft shield doors can be opened and closed by pressing , with the "SmartSens" sensors or manually .

Try different combinations by moving the 3 handles upwards/inwards and downwards/outwards. We recommend aligning the glass draft shield so that only those parts are opened that are required for loading. The balance then operates faster due to less disturbing air flows than with a fully open glass draft shield.

Note

It is recommended to make connections when the draft shield is closed.

Motorized operation

The automatic door function opens and closes the doors of the glass draft shield automatically when required.

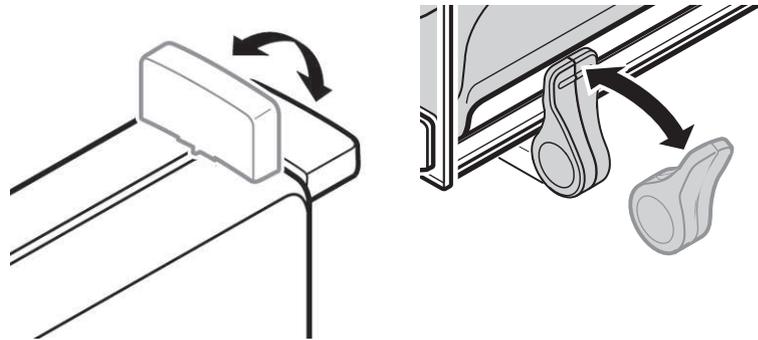
Example

- Doors open automatically for loading the tare weight when  is pressed.
- When a request is made to load the adjustment weight while adjusting the balance, the doors open automatically. The doors close automatically when the weight is loaded.
- The glass draft shield closes automatically for all weighings to achieve a stable weight indication.
- For different operations (e.g. piece counting), the doors open and close automatically as required by the application.

► Handles are locked.

- 1 Move the handles for the side doors inwards.
- 2 Move the handle for the top door into the horizontal position.

⇒ The door is automatically opened when required.



Manual door operation

The doors must be opened or closed manually. With the  keys, via SmartSens or manually.

► Handles are unlocked.

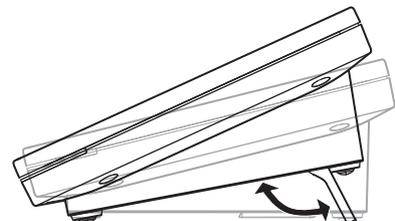
- 1 Move the handles for the side doors outwards.
 - 2 Move the handle for the top door into the vertical position.
 - 3 Press .
- or
Move the hand over the SmartSens sensor.

⇒ The door is opened.

4.7.3 Setting the reading angle and positioning the terminal

4.7.3.1 Changing the reading angle

To change the reading angle, fold out both tilting feet.



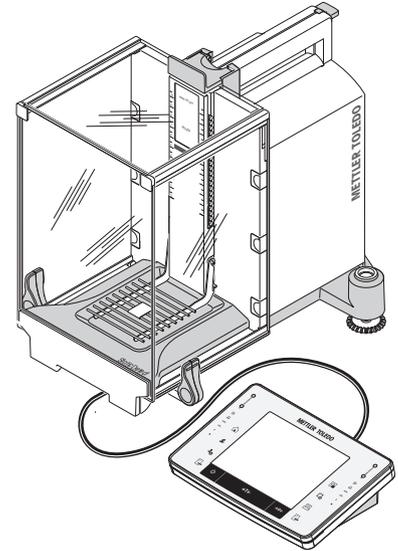
4.7.3.2 Separating the terminal

The terminal is connected to the balance with a cable. For ease of use, the terminal can be separated from the balance and positioned in a different location.

Note

The cable can also be led out from the rear of the balance. If this is more convenient, contact a METTLER TOLEDO representative who will be happy to modify the balance.

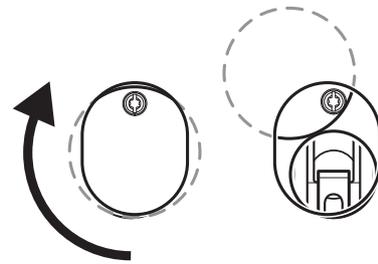
- 1 Switch off the balance with [⏻].
- 2 Carefully lift the terminal off the terminal support.
The terminal support can be left on the balance or removed.
- 3 Carefully remove the cable from the balance if this is possible.
- 4 Position the balance in the required location.
- 5 Switch on the balance with [⏻].



4.7.4 Below-the-balance weighing

The balance is provided with a hanger for below-the-balance weighing.

- 1 Switch off the balance with [⏻].
 - 2 Disconnect the AC adapter cable at the rear of the balance.
 - 3 Disconnect any interface cables.
 - 4 Push all glass draft shield doors back.
 - 5 Lift the terminal off the terminal support.
 - 6 Disconnect the connecting cable.
 - 7 Place the terminal at the side of the balance.
 - 8 Move the balance over the edge of the table until the opening is visible from below, **see** diagram on the left.
 - 9 Slacken the screw until the cover plate can be turned to the side and the hanger for weighing below the balance is easily accessible.
 - 10 Fix the cover plate in the new position with the screw, **see** diagram on the right.
 - 11 Move the balance back to its original position.
 - 12 Connect the terminal cable.
 - 13 Place the terminal in the terminal support.
 - 14 Move all glass draft shield doors to the front.
 - 15 Fix any interface cables.
 - 16 Plug the AC adapter into the power supply socket at the rear of the balance.
 - 17 Switch on the balance with [⏻].
- ⇒ The balance is now ready for mounting the below-the-balance weighing device.



4.7.5 Mounting the ErgoClips

ErgoClips allow simple weighing directly in tare containers.

The supplied ErgoClip or an optional ErgoClip must be mounted as described below.

Attention

Before mounting an ErgoClip, the balance must be switched off with the [⏻] key.

Important note!

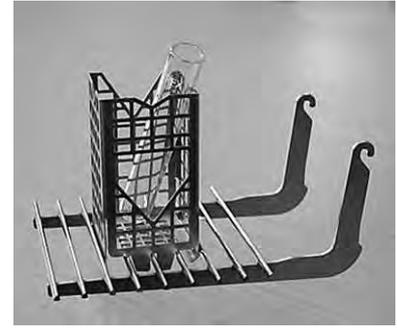
If the balance is not switched off before mounting, the ProFACT function will not be activated.

Reason

The mounted ErgoClip causes the dead load tolerance range of the balance to be exceeded. As a result, the balance does not activate ProFACT so as not to interrupt an assumed weighing process.

When the  status icon is displayed, this means that: "The balance needs to activate ProFACT", but cannot.

- 1 Switch off the balance with [⏻].
- 2 Remove the SmartGrid from the balance.
- 3 Snap the ErgoClip on to the SmartGrid.
- 4 Place the SmartGrid with mounted ErgoClip on the balance.
An optional "Flask" or "Tube" ErgoClip can be used.
- 5 Switch on the balance with [⏻].



4.7.6 Mounting the single-use aluminum weighing pan

The single-use aluminum weighing pan is only suitable for weighing with specific tare containers.

Note

For standard operation with conventional tare containers, we do not recommend using this weighing pan. Its use may affect the stabilization time and degree of accuracy. The listed specifications are reached without a weighing pan.



CAUTION

Hand injuries

- Take care when handling the weighing pan, the corners and edges are extremely sharp!
- Gloves must be worn.

To mount the single-use aluminum weighing pan, remove the SmartGrid from the weighing chamber.

- 1 Remove the SmartGrid from the balance.
- 2 Place the single-use aluminum weighing pan on the SmartGrid from above.
- 3 Fold the 4 side flaps under the bars of the SmartGrid.
- 4 Place the SmartGrid with weighing pan on the balance.



4.7.7 Fitting the SmartGrid cover

Note

For standard operation with conventional tare containers, we do not recommend using this weighing pan. Its use may affect the stabilization time and degree of accuracy. The listed specifications are reached without a weighing pan.

Attention

With the SmartGrid cover fitted, the balance does not switch to the "standby" mode.



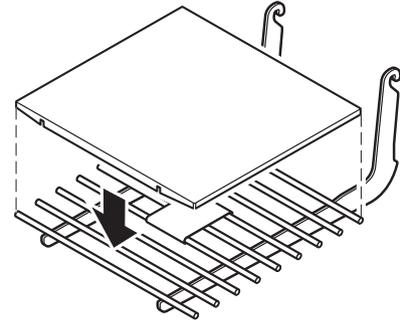
CAUTION

Hand injuries

- Take care when handling the weighing pan, the corners and edges are extremely sharp!
- Gloves must be worn.

To fit the SmartGrid cover, remove the SmartGrid from the weighing chamber.

- 1 Remove the SmartGrid from the balance.
- 2 Gently press the SmartGrid cover on to the SmartGrid.
- 3 Place the SmartGrid with fitted SmartGrid cover on the balance.



4.8 Transporting the balance

4.8.1 Switching off the balance

- 1 Switch off the balance with [⏻].
- 2 Disconnect the balance from the power supply.
- 3 Disconnect all interface cables.

4.8.2 Transport over short distances

To move the balance over a short distance to a new location, follow the instructions below.

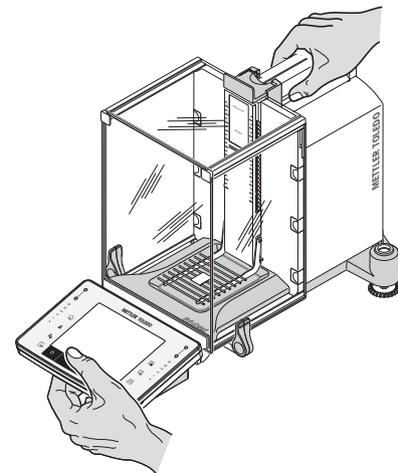


CAUTION

Damage to the balance

Never lift the balance by the glass draft shield or the cooling element, as this can cause damage!

- 1 Hold the balance by the guide for the top draft shield door with one hand.
- 2 Hold the terminal with the other hand.
Since the terminal is not permanently connected to the balance, both the balance and terminal must always be held with one hand.
- 3 Carefully lift the balance and carry it to its new location. **See** Location (page 26).

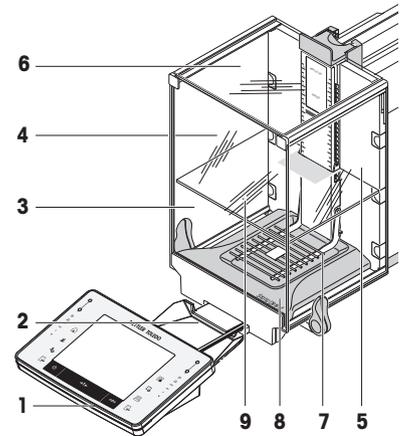


4.8.3 Transport over long distances

The complete original packaging must be used for transportation or shipment of the balance over long distances or if it cannot be ensured that the balance will be transported upright.

Remove the following parts

- 1 Lift the terminal (1) out of the terminal support and place it next to the support.
- 2 Remove the terminal support (2) from the balance.
- 3 Tilt the draft shield front glass (3) away from the balance.
- 4 Carefully move the draft shield side doors (4+5) towards the respective handle and remove the side doors from the guide.
- 5 Lift the front of the top draft shield door (6) and remove it from the guide.
- 6 If the optional intermediate shelf (9) is installed, lift it at the front and remove it upwards.
- 7 Carefully lift the front of the SmartGrid (7) and lift it out of the guide.
- 8 Remove the drip tray (8).



Pack the draft shield, intermediate shelf and terminal support (Items 2-6 and 9)

- Place these parts in the compartments provided in the original packaging.

Note

It is recommended to place paper between the side draft shield glass panels.



Pack the AC adapter, power cord and individual components (Item 7+8)

- 1 Place the AC adapter and power cord in the packaging.
- 2 Place the drip tray (8) upside down in the packaging.
- 3 Place the SmartGrid (7) upside down on the drip tray.
- 4 Place the ErgoClip "Basket" in the packaging.



CAUTION

Damage to the balance

Follow the instructions below to avoid damaging the balance when placing in the packaging.

- 1 Slide the transport protection along the weighing pan guide.
- 2 Move the guide of the top draft shield door to the front.
- 3 Move the handles for the draft shield side doors upwards and slide the doors to the front.



Note

The protective covers supplied with the balance and terminal can be used for packing. These are not shown in the diagrams in order to illustrate how the individual components must be positioned. The use of these protective covers is recommended.

- 1 Place the terminal on the balance, **see** diagram.
- 2 Carefully place the balance in the bottom packaging.



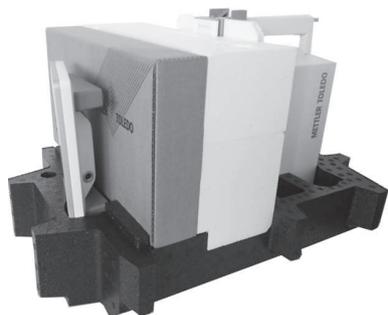
- Remove the terminal and place it in front of the packaging on the table.



- Place the packaging set with the draft shield glass panels in the packaging, **see** diagram.



- 1 Place the set with the AC adapter in front of the set with draft shield glass panels.
- 2 Place the terminal in the packaging as illustrated.



- 1 Place the top packaging in position.
⇒ Ensure that the packaging is correctly positioned.
- 2 Place the lifting strap around both parts of the packaging, **see** diagram.
- 3 Tighten the strap around the packaging.
⇒ Lift the packed balance by the lifting strap and place in the transport box.



5 System Settings

Navigation: [] or [] > [**System**]

This section describes the procedure for adapting the balance to suit specific requirements. The system settings apply to the entire weighing system and therefore to all user profiles and applications.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [].

Note

- The detail of the protocol depends on the point at which printout is activated in the system settings. When [] is pressed in the uppermost level of the system settings, all system settings are recorded. If printing is started in the [**Peripherals**] submenu for example, only the settings for the peripheral devices are recorded.
- The **Test/Adj. Weights**, **Test Sequences** and **Tasks** submenus in the [**Adjust/Test**] menu must be printed separately.
- The system settings can be displayed by pressing [] and subsequently the [**System**] button.
or
Press [] and subsequently the [**System**] button.
⇒ The [**System**] window is displayed.

Example: Printout

System		Autom. ext. Adjust.		Test History	
Adjust/Test		Autom. ext. Adjust.		Adj. History	
ProFACT	On	Weekdays		Adj. History Selection	
ProFACT		Monday	x	Selection	
ProFACT		Tuesday	-	Manual adjust.	x
Weekdays		Wednesday	-	Temperature	x
Monday	x	Thursday	-	Time Adjust.	x
Tuesday	x	Friday	-	Display Datasets Last 50	
Wednesday	x	Saturday	-	Protocol	
Thursday	x	Sunday	-	Date/Time	x
Friday	x	Autom. ext. Test	Off	User	x
Saturday	x	Autom. ext. Test		Balance Type	x
Sunday	x	Weekdays		SNR	x
Time 1	9:00	Monday	x	SW-Version	-
ProFACT		Tuesday	-	Balance ID	-
Time		Wednesday	-	Weight ID	-
Time 2	Off	Thursday	-	Certificate No.	
ProFACT		Friday	-		
Time		Saturday	-		
Time 3	Off	Sunday	-		
ProFACT		Time	9:00		
Time		Time			
Temp.Criterion 1 Kelvin					
Protocol Trigger	On				
Autom. ext. Adjust.	Off				

5.1 System settings overview

The system settings are displayed in the form of symbols. The individual settings can be displayed and changed by tapping the symbols on the touch screen.

- 1 Tap, e.g. [**Adjust/Test**].
⇒ The [**Adjust/Test**] window is displayed.
- 2 Select the required menu item (e.g. **Test Sequences**).

- 3 Tap **[Define]**.
 - ⇒ **Test Sequences** window is displayed.
- 4 Change the settings and confirm with **[OK]**.
- 5 To exit the menu item, tap **[OK]**.
- 6 To exit the system settings, tap **[Exit]** or press **[⏠]**.

	Designation	Explanation
	Adjust/Test	Settings for adjustment and test functions for verification of adjustments.
	Info	Display/printing of balance information.
	Standby	Settings for the standby mode.
	Date/Time	Entry of date and time and selection of required display formats.
	Peripherals	Configuration of interface for various peripheral devices.
	Option	Configuration of the optional interface.
	Administrator	Configuration of the security system of the balance with allocation of access rights and passwords for weighing functions and menus.
	Levelcontrol	Settings for the built-in level sensor.

Menu structure

Main menu	Submenu	Further information
Adjust/Test	Test/Adj. Weights	See Settings for adjustments and tests (page 43)
	Test Sequences	See Test sequences (page 45)
	Tasks	See Tasks (page 62)
	ProFACT / Int. Adj.	See ProFACT/int. Adjustment (page 66)
	Autom. ext. Adjust.	See Automatic adjustment with an external test weight (page 68)
	Autom. ext. Test	See Testing the adjustment with an external test weight (page 69)
	Test History	See Test history (page 70)
	Protocol	See Protocol – Definition of adjustment and test reports (page 71)
Info	Balance ID	See Balance information (page 72)
	Info	
Standby	Standby	See Standby (page 72)
Date/Time	Date format	See Date/Time (page 73)
	Date	
	Time Format	
	Time	

Peripherals	Printer	See Peripherals (page 73)
	Host	
	LabX	
	LabX Controlled Device	
	Tablet Feeder	
	Secondary Display	
	Barcode	
	RFID	
	LC I/O	
Option	DHCP	See Option (page 75)
	IP-Adress	
	Subnet Mask	
	Standard Gateway	
	Domain Name Server	
	Hostname	
Administrator	Protected Area: Enter Administrator ID.	See Administrator (page 76)
	Protected Area: Enter Admin. Password.	
	Administrator ID	
	Administrator Password	
	Master Reset	
	Home Rights	
	User 1 Rights ... User 7 Rights	
	History	
	Passw. Change Date	
	Number of users	
Levelcontrol	Off	See Level sensor (page 81)
	Levelcontrol	

5.2 Adjustment/Test

5.2.1 Introduction for adjustment and tests

This section applies to the configuration of the balance for carrying out adjustments and tests.

- ▶ The balance is assembled and installed as stated in the operating instructions.
- ▶ The balance leveled.
 - 1 Connect the printer to printout settings or reports.
 - 2 Activate the printer as an output device in the peripheral device settings.

Principles for carrying out adjustments and tests

Balances play a decisive role in research, development, quality assurance and production. Weighing errors cost time and money and non-compliance with legal requirements can be detrimental to health. With the **Good Weighing Practice™** of METTLER TOLEDO, the routine testing of balances is efficient, precise and safe. Our **GWP® Verification** Service also offers a unique, personalized document with precise suggestions for the routine testing of balances, taking specific weighing risks into account:

- How the balance should be tested and how often.
- What weights are used.
- What tolerances are appropriate.

GWP® Test Manager was specially developed, as part of our balance firmware, to simplify routine tests. In combination with **GWP® Verification**, efficient balance testing is ensured and specific audit requirements can be fulfilled more easily.

Further information can be found on our website: www.mt.com/GWPVerification

GWP® Test Manager

GWP® Test Manager is a collection of security functions for the balance. These individually programmable functions improve measuring accuracy and routine testing of the balance. Some of these functions serve for routine testing with external test weights. This means that the balance provides active support with test requests and predefined guided sequences. This ensures that outstanding tests are not forgotten and complex tasks such as repeatability tests can be carried out accurately by any person in the laboratory.

Additional functions were developed to prevent measuring errors with active user support and internal sensors. These are, e.g. temperature sensors that can register possible temperature changes in the measuring cell and initiate internal adjustment. The respective location of the balance can be assessed with the aid of the internal weight.

A precondition is the definition of criteria to be fulfilled to ensure that the balance displays appropriate messages or performs specific operations. This is possible with **GWP® Test Manager**. The sequences can be documented via PC software or printer via the interface.

The configuration process

In order to prepare the balance for a routine test and adjustment, a straightforward 3-stage process is required:

- 1 Register the test weights.
 - ⇒ Information relating to all test weights is stored in a balance database.
- 2 Define the test sequence.
 - ⇒ Describes the type of test (method) and the test weight and tolerance with which this must be carried out.
- 3 Carry out the test sequence.
 - ⇒ The task defines when and how the test sequence must be started and carried out.

Documentation and storage

To ensure the traceability of adjustments and tests, it is important to print the settings and periodically the results of the test history.

The results are stored in the test history up to maximum 120 entries. When this limit is reached, the oldest results are overwritten.

Each time the test sequence is changed, the version number is increased and displayed in the right top corner of the display. It is recommended to print and file each new version in a folder.

A complete list of individual settings can be printed by pressing the  key while the respective menu is open.

5.2.2 Settings for adjustments and tests

Navigation:  > [System] > [Adjust/Test]

This section describes all menu options and parameters relating to adjustment and testing of the balance.

For carrying out adjustments and tests, **see** Balance adjustment and testing (page 119).

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Menu item	Explanation	Further information
Test/Adj. Weights	Define the test weights and parameters for adjustment. Procedures for testing or adjustment.	See Test/Adjustment - weight settings (page 44)
Test Sequences	Defines the parameters of a test sequence for testing and behavior of the balance.	See Test sequences (page 45)

Tasks	Defines the task of a test sequence.	See Tasks (page 62)
ProFACT / Int. Adj.	Fully automatic internal balance adjustment.	See ProFACT/int. Adjustment (page 66)
Autom. ext. Adjust.	Adjustment external adjustment.	See Automatic adjustment with an external test weight (page 68)
Autom. ext. Test	Adjustment testing.	See Testing the adjustment with an external test weight (page 69)
Test History	Defines the settings for the test history.	See Test history (page 70)
Protocol	Defines the settings for the adjustment and test protocols.	See Protocol – Definition of adjustment and test reports (page 71)

5.2.2.1 Test/Adjustment - weight settings

Navigation: [] > [System] > [Adjust/Test] > Test/Adj. Weights

This menu can be used to enter the designations or numbers of the certificate supplied with the respective test weight. This enables each external test weight to be clearly assigned to a specific certificate. Up to 12 external test weights can be configured. These test weights are used to carry out external tests and adjustments.

- 1 Tap [**Define**].
⇒ **Test/Adj. Weights** window is displayed.
 - 2 Select an undefined weight or the name of the weight, the parameters of which are to be updated.
 - 3 Tap [**Define**].
 - 4 Change the settings and confirm with [**OK**].
 - 5 To exit the menu item, tap [**OK**].
- ⇒ The defined weights are available for selection again in the test sequences.

Note

When the weight list is displayed, all parameters of the 12 test weights can be printed out with [].

Menu structure

Main menu	Submenu	Further information
Test/Adj. Weight 1 ... Test/Adj. Weight12	Name	See Parameter table
	Weight ID	
	Class	
	Certificate No.	
	Weight Set No.	
	Actual Value	
	Next Recalibration	

The following parameters can be defined:

Parameters	Explanation	Values
Name	Defines a name for a test weight (max. 20 characters). Note Alternatively to the weight ID and certificate number (e.g. 20 g QK).	Any (Test/Adj. Weights)*
Weight ID	Defines the identification (ID) of the weight (max. 20 characters). Note The weight ID is shown in the balance certificate. The ID can also contain a company-specific identification or test equipment number.	Any (Define)*

Class	Selects the predefined class. Note Own can be selected if no other class can be used.	E1* E2 F1 F2 M1 M2 M3 ASTM1 ASTM2 ASTM3 ASTM4 ASTM5 ASTM6 ASTM7 Own
Certificate No.	Defines the certificate number of the external test weight used (max. 20 characters).	Any (Define)*
Weight Set No.	Defines the identification number of the set of weights if the test weight belongs to a set of weights (max. 20 characters).	Any (Define)*
Actual Value	Weight from the weight certificate. Irrespective of the type of balance, the full value should be taken over without taking the decimal places of the balance into account (e.g. 20.00124 g). Note Methods use the actual value; this is rounded to the maximum decimal places of the balance and used for calculation.	Weight (0 g)*
Next Recalibration	Entry of the date of the next weight calibration. Note If no weight calibration is planned, the default value (31.12.2099) should be maintained .	DD.MM.YYYY (31.12.2099)*

* Factory setting

5.2.3 Test sequences

Navigation: [] > [**System**] > [**Adjust/Test**] > **Test Sequences**

Test sequences define which test is carried out with which test weight. The user is guided through the test with the display of clear instructions.

Note

The test should be carried out according to GWP® or other QM systems. The behavior of the balance must also be defined for configuration of the test sequence.

When **Test Sequences** is selected, a list of test sequences, the parameters of which can be adapted or overwritten, is displayed.

Up to 12 test sequences can be defined.

► The test weights required for the test are defined in the **Test/Adj. Weights** menu.

1 Tap [**Define**].

⇒ **Test Sequences** window is displayed.

2 Select an undefined or existing test sequence to be configured or adapted.

3 Tap [**Define**].

⇒ **Test Sequence** window is displayed.

4 Enter the designations and parameters and confirm with [**OK**].

5 To exit the menu item, tap [**OK**].

⇒ The test sequence is stored in the **Test Sequence** menu.

⇒ Each time a test sequence is stored, the version number is increased by 1. The version number is shown at the top right of the display.

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Menu item	Explanation	Further information
Test Sequence 1 ... Test Sequence 12	Defines the parameters for Test Sequence 1 ... Test Sequence 12 .	See Configuration of test sequence parameters (page 46)

Note

When the test sequence list is displayed, all parameters of the 12 test sequences can be printed with .

5.2.3.1 Configuration of test sequence parameters

Navigation:  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1

Menu structure

Main menu	Submenu	Further information
Test Sequence 1	Name	see Name (page 46)
	Preparation Instructions	see Preparations (page 46)
	Method	see Method (page 47)
	Action if Failure	see Error action (page 59)
	Instructions if Failure	see Error instructions (page 61)
	Code to Unblock	see Release code (page 61)
	Entry in GWP History	see Entry in GWP history (page 61)

5.2.3.1.1 Name

Navigation:  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Name

The following parameters can be defined:

Parameters	Explanation	Values
Name	Defines a designation for a test sequence (max. 20 characters). Note The name must be comprehensible to enable clear identification and easy traceability.	Any (Test Sequence 1)*

* Factory setting

5.2.3.1.2 Preparations

Navigation:  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Preparation Instructions

The following parameters can be defined:

Parameters	Explanation	Values
Preparation Instructions	Selection of preparatory instructions. None = no preparatory instructions are displayed in the test sequence. This is normally used for test sequences requiring no user actions, e.g. test sequences with the SERVICE method. Standard = the following preparatory instructions are displayed in the test sequence. These correspond to the typical SOP standard. The instructions must be followed and confirmed with [OK] before the rest of the test sequence can be continued. The Name test sequence was started. Follow the instructions below: 1. Clean the weighing pan. 2. Level the balance. 3. Switch on the printer. 4. Have the test weights ready. 5. Have the weight tweezers/fork ready. When all instructions have been followed, confirm with [OK] and follow further test sequence instructions.	None* Standard

* Factory setting

5.2.3.1.3 Method

Navigation: [] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method

A method describes the type of test to be carried out and defines the main purpose of a test sequence. The test weights and respective tolerances to be used must be defined as part of the method. There are 8 different methods available.

The following parameters can be defined:

Menu item	Explanation	Further information
None	No method has been selected.	
EC	Method for eccentric load test.	see EC Method for eccentric load test (page 49)
RP1	Method for repeatability test.	see RP1 Method for repeatability test (page 50)
RPT1	Method for repeatability test with tare weight.	see RPT1 Method for repeatability test with tare weight (page 51)
SE1	Method for sensitivity test with one test weight.	see SE1 Method for sensitivity test with one test weight (page 53)
SE2	Method for sensitivity test with two test weights.	see SE2 Method for sensitivity test with two test weights (page 54)
SERVICE	Service method.	see SERVICE method reminder/pre-warning time (page 55)
SET1	Method for sensitivity test with tare weight and one test weight.	see SET1 Method for sensitivity test with tare weight and one test weight (page 57)
SET2	Method for sensitivity test with tare weight and two test weights.	see SET2 Method for sensitivity test with tare weight and two test weights (page 58)

The **EC**, **RP1**, **RPT1**, **SE1**, **SE2**, **SET1** and **SET2** methods require the definition of one or more test weights and the respective tolerances.

Note

The **SERVICE** method requires no test weights.

► The test weights required for the test are defined in the **Test/Adj. Weights** menu.

- 1 Select a method (example **EC**).
- 2 Select the test weight for the test.
- 3 Define the test tolerances for the test weight.
- 4 Define the result tolerances for the method result.
- 5 To store the settings, tap [**OK**].

Attention

It is important to distinguish between the test tolerances of the individual weight measurements during the test sequence and the result tolerances (method tolerances) for the final result **EC**, **RP1** and **RPT1** methods). For these methods, two further tolerances are applied to the test sequence result. These two tolerances are equally defined and applied, as for the test tolerances.

Note

If a method is used that calculates a final result, it is recommended to exclude the test and tare weight tolerances so that the complete test sequence is carried out and the result tolerance (method tolerance) **T2** is applied.

Weights

Navigation: [Settings] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > Method > Test Weight

The following parameters can be defined:

Parameters	Explanation	Values
Test/Adj. Weight	Selects the predefined test weight. Test/Adj. Weight 1 ... Test/Adj. Weight12 = defined in Test/Adj. Weights menu item.	Test/Adj. Weight 1 Test/Adj. Weight 2 Test/Adj. Weight 3 Test/Adj. Weight 4 Test/Adj. Weight 5 Test/Adj. Weight 6 Test/Adj. Weight 7 Test/Adj. Weight 8 Test/Adj. Weight 9 Test/Adj. Weight10 Test/Adj. Weight11 Test/Adj. Weight12
Tare Weight	Selects the predefined test weight corresponding to the tare container weight. Test/Adj. Weight 1 ... Test/Adj. Weight12 = defined in Test/Adj. Weights menu item.	Test/Adj. Weight 1 Test/Adj. Weight 2 Test/Adj. Weight 3 Test/Adj. Weight 4 Test/Adj. Weight 5 Test/Adj. Weight 6 Test/Adj. Weight 7 Test/Adj. Weight 8 Test/Adj. Weight 9 Test/Adj. Weight10 Test/Adj. Weight11 Test/Adj. Weight12

Tolerances

Navigation: [Settings] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > Method > Tolerances

Menu structure

Main menu	Submenu	Further information
Tolerances	Tolerance T1	See Section, Definition of test tolerances
	Name T1	
	Tolerance T2	
	Name T2	

Definition of test tolerances

Defines the test weight tolerance. Each test weight has two corresponding tolerances (**T1** and **T2**), which are applied during a test sequence.

The following parameters can be defined:

Parameters	Explanation	Values
Tolerance T1	Defines the weight measuring tolerance T1 . The tolerance T1 is used as a warning for the user and should not be less than T2 . If this tolerance is exceeded, a warning is generated. The user can end the test sequence. A record of this warning is stored in the test history and printed in the report. If T1 is not to be defined as part of the test sequence, it can be deactivated by setting to 100%. Note The minimum value for the tolerance T1 depends on the type of balance and is one digit.	Any
Name T1	Defines a designation for T1 (max. 20 characters).	Any (Warn Limit)*
Tolerance T2	Defines the weight measuring tolerance T2 . When tolerance T2 is reached, the test sequence is aborted. A message is displayed informing the user that the test has failed. The error is stored in the test history and printed in the protocol. If T2 is not to be defined as part of the test sequence, it can be deactivated by setting to 100%. Note The minimum value for the tolerance T2 depends on the type of balance and is one digit.	Any
Name T2	Defines a designation for T2 (max. 20 characters).	Any (Control Limit)*

* Factory setting

Note

When the test menu is open, a complete list of settings can be printed with .

EC Method for eccentric load test

Navigation:  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [EC]

The purpose of the **EC** method (eccentric load test) is to ensure that every eccentric load deviation is within the necessary user SOP tolerances.

The method uses two result tolerances (method tolerances), **s T1** and **s T2**, which are applied to the test sequence result. They function similar to **T1** and **T2**.

Menu structure

Main menu	Submenu	Further information
Test Weight	Test/Adj. Weight	See Section, Test weight
	Tolerances	See Method (page 47)
Tolerance for Eccentricity Dev.	Tolerance EC T1	See Section, Tolerances for eccentric load deviation
	Name EC T1	
	Tolerance EC T2	
	Name EC T2	

Test Weight

Navigation:  > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [EC] > Test Weight > Test/Adj. Weight

The following parameters can be defined:

Parameters	Explanation	Values
Test/Adj. Weight	Selects the predefined test weight. Test/Adj. Weight 1 ... Test/Adj. Weight12 = defined in Test/Adj. Weights menu item.	Test/Adj. Weight 1 Test/Adj. Weight 2 Test/Adj. Weight 3 Test/Adj. Weight 4 Test/Adj. Weight 5 Test/Adj. Weight 6 Test/Adj. Weight 7 Test/Adj. Weight 8 Test/Adj. Weight 9 Test/Adj. Weight10 Test/Adj. Weight11 Test/Adj. Weight12
Tolerances	The tolerances T1 and T2 apply to individual weight measurement and not to eccentric load calculation. Note If the eccentric load test is to be completed, also in the event of an error, T2 must be set to 100%.	Tolerance T1 Name T1 Tolerance T2 Name T2

Tolerances for eccentric load deviation

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [EC] > Test Weight > Tolerance for Eccentricity Dev.

The following parameters can be defined:

Parameters	Explanation	Values
Tolerance EC T1	Defines the tolerance EC T1 for the eccentric load deviation. If the result tolerance (method tolerance) EC T1 is exceeded, the eccentric load test is passed with a warning.	Any (0.10 g)*
Name EC T1	Defines a designation for EC T1 (max. 20 characters).	Any (Warn Limit)*
Tolerance EC T2	Defines the tolerance EC T2 for the eccentric load deviation. If the result tolerance (method tolerance) T2 is exceeded, the eccentric load test fails.	Any (0.10 g)*
Name EC T2	Defines a designation for EC T2 (max. 20 characters).	Any (Control Limit)*

* Factory setting

RP1 Method for repeatability test

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [RP1]

The **RP1** method calculates the mean and standard deviation (Symbol **s**) of a series of measurements with a single test weight in order to determine the repeatability of the balance.

The method uses two result tolerances (method tolerances), **s T1** and **s T2**, which are applied to the test sequence result. They function similar to **T1** and **T2**.

Menu structure

Main menu	Submenu	Further information
Test Weight	Test/Adj. Weight	See Section, Test weight
	Tolerances	See Method (page 47)
Tolerances (s)	Tolerance s T1	See Section, Tolerances (s) for repeatability test
	Name s T1	
	Tolerance s T2	
	Name s T2	
Number of Repetitions	no submenu	See Section, Number of repetitions

Test Weight

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [RP1] > Test Weight > Test/Adj. Weight

The following parameters can be defined:

Parameters	Explanation	Values
Test/Adj. Weight	Selects the predefined test weight. Test/Adj. Weight 1 ... Test/Adj. Weight12 = defined in Test/Adj. Weights menu item.	Test/Adj. Weight 1 Test/Adj. Weight 2 Test/Adj. Weight 3 Test/Adj. Weight 4 Test/Adj. Weight 5 Test/Adj. Weight 6 Test/Adj. Weight 7 Test/Adj. Weight 8 Test/Adj. Weight 9 Test/Adj. Weight10 Test/Adj. Weight11 Test/Adj. Weight12
Tolerances	The test weight tolerances apply to all individual weights, but are not applied to the standard deviation as this is calculated. Note If the repeatability test is to be completed, also in the event of an error, the test weight tolerances must be set to 100%.	Tolerance T1 Name T1 Tolerance T2 Name T2

Tolerances (s) for repeatability test

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [RP1] > Test Weight > Tolerances (s)

The following parameters can be defined:

Parameters	Explanation	Values
Tolerance s T1	Defines the tolerance s T1 for the repeatability test. If the tolerance s T1 is exceeded, the repeatability test is passed with a warning.	Any (0.000 g)*
Name s T1	Defines a designation for s T1 (max. 20 characters).	Any (Warn Limit)*
Tolerance s T2	Define the tolerance s T2 for the repeatability test. If the tolerance s T2 is exceeded, the repeatability test fails.	Any (0.000 g)*
Name s T2	Defines a designation for s T2 (max. 20 characters).	Any (Control Limit)*

* Factory setting

Number of Repetitions

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [RP1] > Test Weight > Number of Repetitions

The following parameters can be defined:

Parameters	Explanation	Values
Number of Repetitions	Defines the number of weight measurements of a series.	2 ... 15 (10)*

* Factory setting

RPT1 Method for repeatability test with tare weight

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [RPT1]

The **RPT1** method calculates the mean and standard deviation (Symbol **s**) of a series of measurements with two test weights in order to determine the repeatability. In contrast to the **RP1** method, a second test weight is used to simulate the use of a tare container.

The method uses two result tolerances (method tolerances), **s T1** and **s T2**, which are applied to the test sequence result. They function similar to **T1** and **T2**.

Menu structure

Main menu	Submenu	Further information
Tare Weight	Test/Adj. Weight	See Section, Tare weight
	Tolerances	See Method (page 47)
Test Weight	Test/Adj. Weight	See Section, Test weight
	Tolerances	See Method (page 47)
Tolerances (s)	Tolerance s T1	See Section, Tolerances (s) for repeatability test
	Name s T1	
	Tolerance s T2	
	Name s T2	
Number of Repetitions	no submenu	See Section, Number of repetitions

Tare Weight

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [RPT1] > Tare Weight > Test/Adj. Weight

The following parameters can be defined:

Parameters	Explanation	Values
Tare Weight	Selects the predefined test weight corresponding to the tare container weight. Test/Adj. Weight 1 ... Test/Adj. Weight12 = defined in Test/Adj. Weights menu item.	Test/Adj. Weight 1 Test/Adj. Weight 2 Test/Adj. Weight 3 Test/Adj. Weight 4 Test/Adj. Weight 5 Test/Adj. Weight 6 Test/Adj. Weight 7 Test/Adj. Weight 8 Test/Adj. Weight 9 Test/Adj. Weight10 Test/Adj. Weight11 Test/Adj. Weight12
Tolerances	It is recommended to set the tare weight tolerances to 100%.	Tolerance T1 Name T1 Tolerance T2 Name T2

Test Weight

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [RPT1] > Test Weight > Test/Adj. Weight

The following parameters can be defined:

Parameters	Explanation	Values
Test/Adj. Weight	Selects the predefined test weight. Test/Adj. Weight 1 ... Test/Adj. Weight12 = defined in Test/Adj. Weights menu item.	Test/Adj. Weight 1 Test/Adj. Weight 2 Test/Adj. Weight 3 Test/Adj. Weight 4 Test/Adj. Weight 5 Test/Adj. Weight 6 Test/Adj. Weight 7 Test/Adj. Weight 8 Test/Adj. Weight 9 Test/Adj. Weight10 Test/Adj. Weight11 Test/Adj. Weight12
Tolerances	The test weight tolerances are applied to each single value, but not to the standard deviation. Note If the repeatability test is to be completed, also in the event of an error, the test weight tolerances must be set to 100%.	Tolerance T1 Name T1 Tolerance T2 Name T2

Tolerances (s) for repeatability test

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [RPT1] > Test Weight > Tolerances (s)

The following parameters can be defined:

Parameters	Explanation	Values
Tolerance s T1	Defines the tolerance s T1 for the repeatability test. If the tolerance s T1 is exceeded, the repeatability test is passed with a warning.	Any (0.000 g)*
Name s T1	Defines a designation for s T1 (max. 20 characters).	Any (Warn Limit)*
Tolerance s T2	Define the tolerance s T2 for the repeatability test. If the tolerance s T2 is exceeded, the repeatability test fails.	Any (0.000 g)*
Name s T2	Defines a designation for s T2 (max. 20 characters).	Any (Control Limit)*

* Factory setting

Number of Repetitions

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [RPT1] > Test Weight > Number of Repetitions

The following parameters can be defined:

Parameters	Explanation	Values
Number of Repetitions	Defines the number of weight measurements of a series.	2 ... 15 (10)*

* Factory setting

SE1 Method for sensitivity test with one test weight

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SE1]

The **SE1** method tests the sensitivity of the balance with one test weight.

Menu structure

Main menu	Submenu	Further information
Test Weight	Test/Adj. Weight	See Section, Test weight
	Tolerances	See Method (page 47)

Test Weight

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SE1] > Test Weight > Test/Adj. Weight

The following parameters can be defined:

Parameters	Explanation	Values
Test/Adj. Weight	Selects the predefined test weight. Test/Adj. Weight 1 ... Test/Adj. Weight12 = defined in Test/Adj. Weights menu item.	Test/Adj. Weight 1 Test/Adj. Weight 2 Test/Adj. Weight 3 Test/Adj. Weight 4 Test/Adj. Weight 5 Test/Adj. Weight 6 Test/Adj. Weight 7 Test/Adj. Weight 8 Test/Adj. Weight 9 Test/Adj. Weight10 Test/Adj. Weight11 Test/Adj. Weight12
Tolerances	The test tolerances are used for the sensitivity test.	Tolerance T1 Name T1 Tolerance T2 Name T2

SE2 Method for sensitivity test with two test weights

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SE2]

The **SE2** method tests the sensitivity of the balance with two test weights.

Menu structure

Main menu	Submenu	Further information
Test Weight 1	Test/Adj. Weight	See Section, Test weight 1
	Tolerances	See Method (page 47)
Test Weight 2	Test/Adj. Weight	See Section, Test weight 2
	Tolerances	See Method (page 47)

Test Weight 1

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SE2] > Test Weight 1 > Test/Adj. Weight

The following parameters can be defined:

Parameters	Explanation	Values
Test/Adj. Weight	Selection of the first predefined test weight. Test/Adj. Weight 1 ... Test/Adj. Weight12 = defined in Test/Adj. Weights menu item.	Test/Adj. Weight 1 Test/Adj. Weight 2 Test/Adj. Weight 3 Test/Adj. Weight 4 Test/Adj. Weight 5 Test/Adj. Weight 6 Test/Adj. Weight 7 Test/Adj. Weight 8 Test/Adj. Weight 9 Test/Adj. Weight10 Test/Adj. Weight11 Test/Adj. Weight12
Tolerances	The test tolerances are used for the sensitivity test.	Tolerance T1 Name T1 Tolerance T2 Name T2

Test Weight 2

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SE2] > Test Weight 2 > Test/Adj. Weight

The following parameters can be defined:

Parameters	Explanation	Values
Test/Adj. Weight	Selects the second predefined test weight. Test/Adj. Weight 1 ... Test/Adj. Weight12 = defined in Test/Adj. Weights menu item.	Test/Adj. Weight 1 Test/Adj. Weight 2 Test/Adj. Weight 3 Test/Adj. Weight 4 Test/Adj. Weight 5 Test/Adj. Weight 6 Test/Adj. Weight 7 Test/Adj. Weight 8 Test/Adj. Weight 9 Test/Adj. Weight10 Test/Adj. Weight11 Test/Adj. Weight12
Tolerances	The test tolerances are used for the sensitivity test.	Tolerance T1 Name T1 Tolerance T2 Name T2

SERVICE method reminder/pre-warning time

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SERVICE]

The **SERVICE** method is a special method that requires no test weight. It is normally set to perform regular checks of various data (dates) in the background. It usually ends automatically without any user action and displayed messages. It is normally used as a reminder for the next service date or MinWeigh date. The date is checked on a regular basis and a message is only displayed when the defined task is due. The **SERVICE** method can also be used to draw early attention to a due test appropriate to the pre-warning time.

The **SERVICE** method can also only be used for the display of **Preparation Instructions**. For example, the user is requested to level the balance on a daily basis. In this special case, the **Preparation Instructions** must be set in the test sequence setting to **Standard**. Ensure that no elements are selected in the method status.

See Configuration of test sequence parameters (page 46).

Note

To enable this test sequence to be ended without user actions, **Preparation Instructions** must be set in the test sequence to **None**.

The following parameters can be defined:

Menu item	Explanation	Further information
Status	Defines the data (dates) to be checked in this test sequence. Note Multiple selections are possible for all available options. The user receives a message when this task is due.	See Section, Status
Early Warning Alert	Defines the alarm pre-warning time.	See Parameter table

Status

Menu structure

Main menu	Submenu	Further information
Status	Battery Change	See Parameter table
	Service	
	MinWeigh	
	Weight	
	Task 1	
	Task 2	
	Task 3	
	Task 4	
	Task 5	
	Task 6	
	Task 7	
	Task 8	
	Task 9	
Task 10		
Task 11		
Task 12		
Early Warning Alert	no submenu	

The following parameters can be defined:

Parameters	Explanation	Values
Battery Change	Date of next battery replacement.	<input type="checkbox"/> (deactivated)* <input checked="" type="checkbox"/> (activated)
Service	Date of next service.	<input type="checkbox"/> (deactivated)* <input checked="" type="checkbox"/> (activated)
MinWeigh	Date of next MinWeigh.	<input type="checkbox"/> (deactivated)* <input checked="" type="checkbox"/> (activated)
Weight	Date of next calibration (for all test weights).	<input type="checkbox"/> (deactivated)* <input checked="" type="checkbox"/> (activated)
Task 1 ... Task 12	Date of next task display. Settings for task configuration, see Tasks (page 62).	<input type="checkbox"/> (deactivated)* <input checked="" type="checkbox"/> (activated)
Early Warning Alert	<p>Defines how early the alarm is to be generated. The battery replacement reminder can be displayed, e.g. 7 days prior to the due date.</p> <p>If the test is passed in the pre-warning period, it is recorded as "passed with warning". If the pre-warning period has expired, the test is failed. Further instructions, see Error instructions (page 61).</p> <p>Note When using the pre-warning time as a reminder for other tasks, 2 tasks are required - one for the original test sequence and one for the reminder.</p> <p>With the SERVICE method, several dates can be checked simultaneously, see Multiple selection under Status. The same pre-warning time applies to all dates however. If different pre-warning times are necessary, several SERVICE methods must be defined.</p> <p>The reminder task is created to regularly check the data. Select the test frequency in relation to the pre-warning period and frequency of the test sequence being carried out.</p>	1 ... 365 days (7 days)*

* Factory setting

SET1 Method for sensitivity test with tare weight and one test weight

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SET1]

The **SET1** method tests the sensitivity of the balance with two test weights. The first test weight is used to simulate a tare container.

Menu structure

Main menu	Submenu	Further information
Tare Weight	Test/Adj. Weight	See Section, Tare weight
	Tolerances	See Method (page 47)
Test Weight	Test/Adj. Weight	See Section, Test weight
	Tolerances	See Method (page 47)

Tare Weight

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SET1] > Tare Weight > Test/Adj. Weight

The following parameters can be defined:

Parameters	Explanation	Values
Tare Weight	Selects the predefined test weight corresponding to the tare container weight. Test/Adj. Weight 1 ... Test/Adj. Weight12 = defined in Test/Adj. Weights menu item. Note A check is initially carried out to see whether the tare weight is within the predefined weight tolerances. Whilst on the balance, the test weight is used to determine the sensitivity.	Test/Adj. Weight 1 Test/Adj. Weight 2 Test/Adj. Weight 3 Test/Adj. Weight 4 Test/Adj. Weight 5 Test/Adj. Weight 6 Test/Adj. Weight 7 Test/Adj. Weight 8 Test/Adj. Weight 9 Test/Adj. Weight10 Test/Adj. Weight11 Test/Adj. Weight12
Tolerances	It is recommended to set the tare weight tolerances to 100%.	Tolerance T1 Name T1 Tolerance T2 Name T2

Test Weight

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SET1] > Test Weight > Test/Adj. Weight

The following parameters can be defined:

Parameters	Explanation	Values
Test/Adj. Weight	Selects the predefined test weight. Test/Adj. Weight 1 ... Test/Adj. Weight12 = defined in Test/Adj. Weights menu item.	Test/Adj. Weight 1 Test/Adj. Weight 2 Test/Adj. Weight 3 Test/Adj. Weight 4 Test/Adj. Weight 5 Test/Adj. Weight 6 Test/Adj. Weight 7 Test/Adj. Weight 8 Test/Adj. Weight 9 Test/Adj. Weight10 Test/Adj. Weight11 Test/Adj. Weight12

Tolerances	The test tolerances are used for the sensitivity test.	Tolerance T1 Name T1 Tolerance T2 Name T2
-------------------	--	--

SET2 Method for sensitivity test with tare weight and two test weights

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SET2]

The **SET2** method tests the sensitivity of the balance with three test weights. The second test weight (tare weight) is used to simulate a tare container.

Menu structure

Main menu	Submenu	Further information
Test Weight 1	Test/Adj. Weight	See Section, Test weight 1
	Tolerances	See Method (page 47)
Tare Weight	Test/Adj. Weight	See Section, Tare weight
	Tolerances	See Method (page 47)
Test Weight 2	Test/Adj. Weight	See Section, Test weight 2
	Tolerances	See Method (page 47)

Test Weight 1

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SET2] > Test Weight 1 > Test/Adj. Weight

The following parameters can be defined:

Parameters	Explanation	Values
Test/Adj. Weight	Selection of the first predefined test weight. Test/Adj. Weight 1 ... Test/Adj. Weight12 = defined in Test/Adj. Weights menu item.	Test/Adj. Weight 1 Test/Adj. Weight 2 Test/Adj. Weight 3 Test/Adj. Weight 4 Test/Adj. Weight 5 Test/Adj. Weight 6 Test/Adj. Weight 7 Test/Adj. Weight 8 Test/Adj. Weight 9 Test/Adj. Weight10 Test/Adj. Weight11 Test/Adj. Weight12
Tolerances	The test tolerances are used for the sensitivity test.	Tolerance T1 Name T1 Tolerance T2 Name T2

Tare Weight

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Method > [SET2] > Tare Weight > Test/Adj. Weight

The following parameters can be defined:

Parameters	Explanation	Values
Tare Weight	Selects the predefined test weight corresponding to the tare container weight. Test/Adj. Weight 1 ... Test/Adj. Weight12 = defined in Test/Adj. Weights menu item. Note A check is initially carried out to see whether the tare weight is within the predefined weight tolerances. Whilst on the balance, the test weight is used to determine the sensitivity.	Test/Adj. Weight 1 Test/Adj. Weight 2 Test/Adj. Weight 3 Test/Adj. Weight 4 Test/Adj. Weight 5 Test/Adj. Weight 6 Test/Adj. Weight 7 Test/Adj. Weight 8 Test/Adj. Weight 9 Test/Adj. Weight10 Test/Adj. Weight11 Test/Adj. Weight12
Tolerances	It is recommended to set the tare weight tolerances to 100%.	Tolerance T1 Name T1 Tolerance T2 Name T2

Test Weight 2

Navigation: [Icon] > [System] > [Adjust/Test] > **Test Sequences** > **Test Sequence 1** > Method > [SET2] > **Test Weight 2** > **Test/Adj. Weight**

The following parameters can be defined:

Parameters	Explanation	Values
Test/Adj. Weight	Selects the second predefined test weight. Test/Adj. Weight 1 ... Test/Adj. Weight12 = defined in Test/Adj. Weights menu item.	Test/Adj. Weight 1 Test/Adj. Weight 2 Test/Adj. Weight 3 Test/Adj. Weight 4 Test/Adj. Weight 5 Test/Adj. Weight 6 Test/Adj. Weight 7 Test/Adj. Weight 8 Test/Adj. Weight 9 Test/Adj. Weight10 Test/Adj. Weight11 Test/Adj. Weight12
Tolerances	The test tolerances are used for the sensitivity test.	Tolerance T1 Name T1 Tolerance T2 Name T2

5.2.3.1.4 Error action

Navigation: [Icon] > [System] > [Adjust/Test] > **Test Sequences** > **Test Sequence 1** > **Action if Failure**

Defines how the balance should react if the test fails or is aborted. There are 3 types of behavior.

Menu structure

Main menu	Submenu	Further information
None	no submenu	
Warning	Warning Message	See Section, Warning
	Time Interval	
	Max. Number Of Warnings	
	Action after Failure	
Attempts	1	See Section, Attempts
	2	
	3	
	Until Passed	

Warning

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Action if Failure > Warning

The following parameters can be defined:

Parameters	Explanation	Values
Warning Message	<p>Defines the warning dialog for the user.</p> <p>The user can work as normal, but receives repeated warnings that the test sequence has failed. The user is requested to restart the test sequence.</p> <p>The dialog window with the warning dialog also contains a [Start] button for restarting the test sequence.</p> <p>Standard = the test sequence Name has failed. Start the test sequence again.</p> <p>Advanced = the test sequence Name has failed. Follow the steps below: 1. Check the weighing parameters. 2. Start the test sequence again via function key or directly via the [Start] button.</p> <p>Note</p> <ul style="list-style-type: none"> To start the test sequence via the function key, the [Test Sequence] function key must be activated. If the [Start] button is deactivated (grayed), the current user is not authorized to start the test sequence. 	Standard* Advanced
Time Interval	Defines the time (in hours) until the warning is displayed again.	1 ... 1000 h (1 h)*
Max. Number Of Warnings	<p>Defines the maximum permitted number of warnings for this test sequence.</p> <p>When the maximum number is reached and the test sequence was not successfully completed, the balance is blocked.</p>	1 ... 1000 (1)*
Action after Failure	<p>Defines how a test sequence (already in warning mode) should behave if it fails again or is aborted during the method sequence.</p> <p>None = the test sequence is aborted and restarted after lapse of the next warning interval. See Max. Number Of Warnings.</p> <p>1 Attempt, 2 Attempts or 3 Attempts = in contrast to None, the balance does not return to the warning mode. The test sequence must be passed within the number of attempts defined here or the balance will be blocked.</p> <p>Until Passed = permits an unlimited number of attempts. The balance does not return to the warning mode.</p> <p>Note If GWP History is activated, only the last result and number of attempts are stored.</p>	None* 1 Attempt 2 Attempts 3 Attempts Until Passed

* Factory setting

Attempts

Navigation: [🔧] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Action if Failure > Attempts

The following parameters can be defined:

Parameters	Explanation	Values
Attempts	<p>Defines how often a test may be carried out until it is passed.</p> <p>1, 2 or 3 = the test must be passed within the defined number of attempts or the balance is blocked.</p> <p>In contrast to Warning, it is not possible to continue to work with the balance between attempts, but only when the test has been passed.</p> <p>Until Passed = permits an unlimited number of attempts.</p> <p>Note If GWP History is activated, only the last result and number of attempts are stored.</p>	1* 2 3 Until Passed

* Factory setting

Note

On successful completion of the test sequence, no more warning dialogs are displayed. If a specific test sequence blocks the balance, the warning mode is cancelled on release so that no further warning messages are displayed.

5.2.3.1.5 Error instructions

Navigation: [] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Instructions if Failure

Defines instructions for the user, which are displayed if the test was unsuccessful.

The following parameters can be defined:

Parameters	Explanation	Values
Instructions if Failure	<p>Defines the instructions.</p> <p>This setting is independent of the parameters Action if Failure and is displayed each time a test sequence fails.</p> <p>None = the test sequence Name has failed.</p> <p>Standard = the test sequence Name has failed. The balance is outside the defined tolerances. Contact a responsible person within your company or METTLER TOLEDO service.</p>	None* Standard

* Factory setting

5.2.3.1.6 Release code

Navigation: [] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Code to Unblock

If the system is blocked due to a failed test sequence (corresponding to the **Action if Failure** settings), the test sequence can be released with **Code to Unblock**.

The following parameters can be defined:

Parameters	Explanation	Values
Code to Unblock	<p>System release.</p> <p>Note If Action if Failure None is selected, a failed test sequence will never block the balance.</p>	Any (Z)*

* Factory setting

5.2.3.1.7 Entry in GWP history

Navigation: [] > [System] > [Adjust/Test] > Test Sequences > Test Sequence 1 > Entry in GWP History

The GWP history can store up to 120 test results. Due to this limitation, it may not be necessary to store test sequence results that have no quality references, e.g. test sequences with the SERVICE method.

The following parameters can be defined:

Parameters	Explanation	Values
Entry in GWP History	<p>Defines whether the test result is stored in the GWP history.</p> <p>Yes = result of test sequence is stored.</p> <p>No = result of test sequence is not stored.</p> <p>Note If 120 entries are exceeded, the oldest result is overwritten with the newest result.</p>	Yes No*

* Factory setting

5.2.4 Tasks

Navigation:  > [System] > [Adjust/Test] > Tasks

Tasks define when a test sequence must be carried out and how it is started.

Up to 12 tasks can be defined.

► The test sequence is defined in the **Test Sequence** menu.

1 Tap [**Define**].

⇒ The **Tasks** window is displayed.

2 Select the test sequence for the task.

⇒ The **Task State** window is displayed.

⇒ When a test sequence is assigned to a task, the name appears in the task list.

3 Tap [**On**] and subsequently the associated button.

⇒ **Task** window is displayed.

4 Define the settings and confirm with [**OK**].

5 To exit the menu item, tap [**OK**].

⇒ The date for carrying out the next test sequence is recalculated.

⇒ The date for carrying out the next test is calculated at the end of each completed test sequence.

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Menu item	Explanation	Further information
Task 1 ... Task 12	Defines the tasks for the test sequence.	See Task status (page 62)

Note

When the task list is displayed, all parameters of the 12 tasks can be printed with .

5.2.4.1 Task status

Navigation:  > [System] > [Adjust/Test] > Tasks > Task 1

The task can be activated or deactivated in the task status window. Deactivated tasks are ignored by the system. Activated tasks can be changed or supplemented.

The following parameters can be defined:

Parameters	Explanation	Values
Task 1	Defines the task status.	Off* On

* Factory setting

The following parameters can be defined:

Menu item	Explanation	Further information
Off	No task.	
On	Assign a test sequence to a task.	See Assigning a test sequence to a task. (page 63)

Note

When the task status is open, a complete list of settings can be printed with .

5.2.4.2 Assigning a test sequence to a task.

Navigation:  > [System] > [Adjust/Test] > Tasks > Task 1 > [On]

When **Test Sequence** is selected, the user can assign a test sequence to a task from a list of already defined test sequences.

Menu structure

Main menu	Submenu	Further information
Test Sequence	no submenu	
Starting Method	Defines the starting mode of a task.	See Starting method (page 63)
Defined Days	Defines the day on which the task is to be performed.	See Defined days (page 65)
Defined Users	Defines the users authorized to start the task.	See Defined users (page 66)

The following parameters can be defined:

Parameters	Explanation	Values
Test Sequence	Selects a predefined test sequence. Test Sequence 1 ... Test Sequence 12 = defined in Test Sequences menu item.	Task 1 Task 2 Task 3 Task 4 Task 5 Task 6 Task 7 Task 8 Task 9 Task 10 Task 11 Task 12

5.2.4.3 Starting method

Navigation:  > [System] > [Adjust/Test] > Tasks > Task 1 > [On] > Starting Method

A test sequence defined in the task can be started in 4 different ways.

Menu structure

Main menu	Submenu	Further information
Starting Method	Manual	See Section, Manual
	On User Change	See Section, Change of user
	Interval	See Section, Interval
	On Power On	See Section, Switching on

Manual

The test sequence can be started as required by pressing the [**Test Sequence**] function key on the main display of the balance.

The following parameters can be defined:

Parameters	Explanation	Values
Manual	Defines the manual starting method. Note <ul style="list-style-type: none"> The day on which the test sequence can be started is defined in the Defined Days task settings, see Defined days (page 65). Defined in the Defined Users task settings are the users authorized to start the test sequence, see Defined users (page 66). 	None

On User Change

The test sequence is displayed with a change of user.

The following parameters can be defined:

Parameters	Explanation	Values
On User Change	Defines the starting method. Note <ul style="list-style-type: none"> If the day on which a change of user takes place is not activated in the Defined Days task setting, the test sequence is not carried out. See Defined days (page 65). If a user is not selected in the Defined Users task setting, the test sequence is not carried out. See Defined users (page 66). 	None

Interval

Defines the interval in which the balance automatically starts the test sequence.

If the date/time of the terminal is changed, it is recommended to recalculate the already calculated next interval-task display dates. Carry out the following steps:

- Go to the respective task menu of the interval-task and subsequently tap the associated button.
- Tap [**Off**].
- Confirm with [**OK**].
⇒ The next due date is deleted.
- Return to the just closed task menu.
- Tap [**On**].
- Confirm with [**OK**].
⇒ The next due date is recalculated and the task is active again.

Note

Repeat these steps for all interval-tasks.

Menu structure

Main menu	Submenu	Further information
Interval	Interval Start Time	See Parameter table
	Interval	

The following parameters can be defined:

Parameters	Explanation	Values
Interval Start Time	<p>Defines the time of day when the test is to be carried out.</p> <p>Note To ensure that a test is completed before working with the balance, the starting time should be set earlier than necessary.</p> <p>Example The starting time is set at 7:00 when work begins at about 8:00.</p>	0:00 ... 23:59 (08:00)*
Interval	<p>Defines the intervals in days between the tests.</p> <p>Note If a test cannot be carried out as scheduled, because it falls on a public holiday, the test remains due. If the test falls due again up until its completion, it only needs to be carried out once.</p> <p>Example A daily task must only be performed once on Monday, even if a request from the previous Saturday or Sunday is still due.</p>	1 Day ... 720 Days (1 day)*

* Factory setting

On Power On

If active, the test sequence is started when the balance is switched on. This can be useful in situations where the balance is disconnected from the mains supply or in the event of a general power failure.

The following parameters can be defined:

Parameters	Explanation	Values
On Power On	Activates the test sequence.	None

5.2.4.4 Defined days

Navigation: [] > [System] > [Adjust/Test] > Tasks > Task 1 > [On] > Defined Days

Defines the day on which the task is to be performed. Irrespective of the starting method, the task is only performed on specific days,

Important

Warning dialogs for failed tests are also displayed on undefined days! The test sequence can be started directly from the warning dialog, provided the current user is defined.

See Defined users (page 66).

The following parameters can be defined:

Parameters	Explanation	Values
Defined Days	<p>Defines the day on which the task is to be performed.</p> <p>Note</p> <ul style="list-style-type: none"> Test sequences with the Manual starting method appear in the test selection list only on the days defined here, see Starting method (page 63). Test sequences with the On User Change starting method are only displayed on the days defined here. Test sequences with the Interval starting method are only displayed on the days defined here. If the day on which a test sequence is due is not defined, the test sequence is postponed until the next defined day. 	<p>Monday* Tuesday* Wednesday* Thursday* Friday* Saturday* Sunday*</p> <p><input type="checkbox"/> (deactivated) <input checked="" type="checkbox"/> (activated)*</p>

* Factory setting

5.2.4.5 Defined users

Navigation: [🔧] > [System] > [Adjust/Test] > Tasks > Task 1 > [On] > Defined Users

Defines the users authorized to start the task. Irrespective of the starting method, only selected users can perform the task.

Important

All users receive warnings of failed or aborted tests. Warning dialogs are only generated for test sequences, if these are configured with a **Action if Failure** warning.

See Error action (page 59).

The following parameters can be defined:

Parameters	Explanation	Values
Defined Users	<p>Defines the users authorized to start the task.</p> <p>Note</p> <ul style="list-style-type: none"> • Test sequences with the Manual starting method appear in the test selection list only for the defined users selected here. • Test sequences with On User Change start methods are only displayed when the new user belongs to the users selected here. • Test sequences with Interval start methods are only displayed when the new user belongs to the users selected here. If the user is not defined, the test sequence is postponed until a defined user registers. 	<p>Home* User 1* User 2* User 3* User 4* User 5* User 6* User 7*</p> <p><input type="checkbox"/> (deactivated) <input checked="" type="checkbox"/> (activated)*</p>

* Factory setting

5.2.5 ProFACT/int. Adjustment

Navigation: [🔧] > [System] > [Adjust/Test] > ProFACT / Int. Adj.

ProFACT stands for Professional Fully Automatic Calibration Technology and offers fully automatic internal balance adjustment with an internal weight, based on preselected time and/or temperature criteria.

ProFACT / Int. Adj. is switched on by default and can be switched off as required.

- 1 Under **ProFACT / Int. Adj.**, tap the associated button.
- 2 Tap [**ProFACT / Int. Adj.**] and subsequently the [**Define**] button.
⇒ **ProFACT** window is displayed.
- 3 Change the settings and confirm with [**OK**].
- 4 To exit the menu item, tap [**OK**].

The following parameters can be defined:

Menu item	Explanation	Further information
ProFACT / Int. Adj.	Defines the behavior of the ProFACT adjustment function.	See Definition of parameters for ProFACT (page 66)

5.2.5.1 Definition of parameters for ProFACT

Navigation: [🔧] > [System] > [Adjust/Test] > ProFACT / Int. Adj. > [ProFACT / Int. Adj.]

Note

With approved balances (according to OIML accuracy class II), **ProFACT / Int. Adj.** cannot be switched off.

Menu structure

Main menu	Submenu	Further information
Off	no submenu	

ProFACT / Int. Adj.	Weekdays	See Parameter table
	Time 1	
	Time 2	
	Time 3	
	Temp.Criterion	
	Protocol Trigger	
	Advanced Options	See Extended options (page 67)

The following parameters can be defined:

Parameters	Explanation	Values
Weekdays	Define the days on which fully automatic calibration is to be performed. If time-controlled adjustment is not required, deactivate all days.	Monday* Tuesday* Wednesday* Thursday* Friday* Saturday* Sunday* <input type="checkbox"/> (deactivated) <input checked="" type="checkbox"/> (activated)*
Time 1	1. Defines the time for automatic adjustment. Note Up to 3 different times can be defined for the selected days.	Off Time 1* 0:00 ... 23:59 (9:00)*
Time 2	2. Defines the time for automatic adjustment.	Off* Time 2 0:00 ... 23:59
Time 3	3. Defines the time for automatic adjustment.	Off* Time 3 0:00 ... 23:59
Temp.Criterion	Defines the temperature difference, which initiates automatic adjustment.	Off 0.5 Kelvin 1 Kelvin 2 Kelvin* 3 Kelvin
Protocol Trigger	Defines when a protocol is to be printed automatically. On = protocol is automatically printed when automatic adjustment is initiated. Off = no printing.	On* Off
Advanced Options	This function can be used to extend ProFACT and internal adjustment procedures with internal tests.	Off* On

* Factory setting

5.2.5.2 Extended options

Navigation: [] > [System] > [Adjust/Test] > ProFACT / Int. Adj. > [ProFACT / Int. Adj.] > **Advanced Options**

Adjustment can be adapted to suit particular requirements by activating the extension option function.

Menu structure

Main menu	Submenu	Further information
Off	no submenu	
On	As Found	See Parameter table
	Levelcontrol	
	As Left	
	Tolerances	
	Blocking	
	Code to Unblock	

The following parameters can be defined:

Parameters	Explanation	Values
As Found	Activates the input test. At the start of the adjustment sequence, an internal test (sensitivity) is performed to ascertain the actual status. The input test is automatically started when the adjustment sequence is activated and the result is displayed and recorded.	No* Yes
Levelcontrol	Activates leveling. The level of the balance is checked. Note If no level sensor is available or the balance is not leveled, the user is requested to check the level of the balance. The adjustment sequence is stopped until the user confirms the request.	No* Yes
As Left	Activates the output test. When adjustment is complete, an internal test (sensitivity) is performed from anew.	No* Yes
Tolerances	Defines the tolerances. Defines the tolerances applied during the input test and output test, see Method (page 47).	Tolerance T1 Name T1 Tolerance T2 Name T2
Blocking	Blocks the balance. Defines whether the balance is to be blocked after exceeding the tolerance T2 in the input test or output test or after aborting adjustment. If the balance is blocked, it cannot be used until it is released with the appropriate release code.	No* Yes
Code to Unblock	Releases the balance. Defines the code required to release a balance that has been blocked due to an input test, adjustment or output test error.	Any (Z)*

* Factory setting

5.2.6 Automatic adjustment with an external test weight

Navigation: [] > [System] > [Adjust/Test] > Autom. ext. Adjust.

If work is carried out with an external test weight, this setting can be used to define days and times when the balance requests adjustment. Further information on the (automatic) adjustment process with an external test/adjustment weight can be found under Adjustment with external test weight (page 120).

- 1 Under **Autom. ext. Adjust.**, tap the associated button.
- 2 Tap [**On**] and subsequently the [**Define**] button.
⇒ **Autom. ext. Adjust.** window is displayed.
- 3 Change the settings and confirm with [**OK**].
- 4 To exit the menu item, tap [**OK**].

The following parameters can be defined:

Menu item	Explanation	Further information
Autom. ext. Adjust.	Defines the behavior of the adjustment function.	See Definition of parameters for automatic adjustment (page 68)

5.2.6.1 Definition of parameters for automatic adjustment

The behavior of the automatic external adjustment function can be set by tapping the [**Define**] button.

Menu structure

Main menu	Submenu	Further information
Off	no submenu	

On	Weekdays	See Parameter table
	Time	

The following parameters can be defined:

Parameters	Explanation	Values
Weekdays	Defines the days on which adjustment is to be carried out.	Monday* Tuesday Wednesday Thursday Friday Saturday Sunday <input type="checkbox"/> (deactivated) <input checked="" type="checkbox"/> (activated)*
Time	Defines the adjustment time. The time for automatic adjustment can be entered for the selected days.	0:00 ... 23:59 (8:00)*

* Factory setting

5.2.7 Testing the adjustment with an external test weight

Navigation: [] > [System] > [Adjust/Test] > **Autom. ext. Test**

This setting can be used to enter days and times when testing of the adjustment with an external test weight is to be performed and the balance displays a reminder message. Further information can be found under Testing the adjustment with external test weight (page 122).

- Under **Autom. ext. Test**, tap the associated button.
- Tap [**On**] and subsequently the [**Define**] button.
⇒ **Autom. ext. Test** window is displayed.
- Change the settings and confirm with [**OK**].
- To exit the menu item, tap [**OK**].

The following parameters can be defined:

Menu item	Explanation	Further information
Autom. ext. Test	Defines the behavior of the test function.	See Definition of parameters for testing the adjustment (page 69)

5.2.7.1 Definition of parameters for testing the adjustment

The behavior of the automatic external test function can be set by tapping the [**Define**] button.

Menu structure

Main menu	Submenu	Further information
Off	no submenu	
On	Weekdays	See Parameter table
	Time	

The following parameters can be defined:

Parameters	Explanation	Values
Weekdays	Defines the days on which the adjustment test is to be performed.	Monday* Tuesday Wednesday Thursday Friday Saturday Sunday <input type="checkbox"/> (deactivated) <input checked="" type="checkbox"/> (activated)*
Time	Defines the test time. The time can be entered for the selected days.	0:00 ... 23:59 (9:00)*

* Factory setting

5.2.8 Test history

Navigation: [] > [System] > [Adjust/Test] > Test History

The balance always records all adjustment data and the required results of performed tests and stores these in a special fail-safe memory. The options in the test history allow the selection of results for documentation or printing.

Note

When the memory is full (120 entries for the GWP history), the oldest entries are automatically deleted and overwritten by new entries. It is important to ensure that entries required for the documentation standards are printed and archived to ensure full traceability of the performed tests and adjustments.

- 1 Under **Test History**, tap the [**Define**] button.
⇒ **Test History** window is displayed.
- 2 Change the settings and confirm with [**OK**].
- 3 To exit the menu item, tap [**OK**].

Menu structure

Main menu	Submenu	Further information
Test History	Adj. History	See Section Adjustment History
	Adj. History Selection	See Section Adjustment History selection
	GWP History	See Section GWP History

Adj. History

A window with a list of performed adjustments can be displayed by tapping [**Show**]. Although the balance permanently records all adjustments made, only those selected for display in **Adj. History Selection** are listed. Specific data is displayed for each adjustment: date and time, type of adjustment, temperature, leveling. The complete list can be printed with [].

The following parameters can be defined:

Parameters	Explanation	Values
Adj. History	Displays the performed adjustments.	Show

Adj. History Selection

Menu structure

Main menu	Submenu	Further information
Adj. History Selection	Selection	See Parameter table
	Display Datasets	

The following parameters can be defined:

Parameters	Explanation	Values
Selection	Selects the results to be stored. Select the adjustments to be displayed in the adjustment history. The list can be selectively shortened (including printout) for improved clarity. Note The balance records all adjustment operations. The settings in this menu define the operations to be displayed in the list.	Manual adjust.* Temperature* Time Adjust.* <input type="checkbox"/> (deactivated) <input checked="" type="checkbox"/> (activated)*
Display Datasets	Defines the number of displayed datasets.	Last 50* Last 40 Last 30 Last 20 Last 10

* Factory setting

GWP History

A window with a list of test sequence results can be displayed by tapping **Show**. The currently displayed result can be scrolled with the [▼] and [▲] keys. The previous or next result can be displayed with the [>>] and [←←] keys. The displayed entry can be printed with [🖨]. The GWP history can store maximum 120 entries. Only the results of test sequences are stored where the GWP history was set to [Yes].

See Entry in GWP history (page 61).

The following parameters can be defined:

Parameters	Explanation	Values
GWP History	Displays the history entries	Show

5.2.9 Protocol – Definition of adjustment and test reports

Navigation: [🔧] > [System] > [Adjust/Test] > Protocol

Information to be printed in the adjustment and test reports can be defined in the settings.

- Under **Protocol**, tap the [Define] button.
⇒ **Adjustment and test protocol selection** window is displayed.
- Change the settings and confirm with [OK].
- To restore the factory default settings, tap [STD].
- To exit the menu item, tap [OK].

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Menu item	Explanation	Further information
Protocol	Defines the information to be printed in the protocol.	See Parameter table

The following parameters can be defined:

Parameters	Explanation	Values
Date/Time	The date and time of the adjustment/test are printed in the defined date and time format.	<input type="checkbox"/> (deactivated) <input checked="" type="checkbox"/> (activated)*
User	Name of the active user profile during the adjustment/test (not for automatic ProFact adjustment).	<input type="checkbox"/> (deactivated) <input checked="" type="checkbox"/> (activated)*
Balance Type	This information is stored in the balance and terminal cannot be changed by the user.	<input type="checkbox"/> (deactivated) <input checked="" type="checkbox"/> (activated)*
SNR	The serial numbers of the balance and terminal are printed. This information cannot be changed by the user.	<input type="checkbox"/> (deactivated) <input checked="" type="checkbox"/> (activated)*
SW-Version	The version numbers of the balance firmware (one number each for the terminal and balance) are printed.	<input type="checkbox"/> (deactivated)* <input checked="" type="checkbox"/> (activated)
Balance ID	The defined balance identification is printed. Balance information settings	<input type="checkbox"/> <input type="checkbox"/> (deactivated)* <input checked="" type="checkbox"/> (activated)
Weight ID	The identification number of the external test weight used.	<input type="checkbox"/> (deactivated)* <input checked="" type="checkbox"/> (activated)
Certificate No.	The certificate number of the external test weight used.	<input type="checkbox"/> (deactivated)* <input checked="" type="checkbox"/> (activated)
Temperature	Temperature at the time of adjustment or test.	<input type="checkbox"/> (deactivated)* <input checked="" type="checkbox"/> (activated)
Nominal Weight	Corresponds to the actual external test weight used for the adjustment/test.	<input type="checkbox"/> (deactivated) <input checked="" type="checkbox"/> (activated)*
Actual Weight	The actual recorded weight of an external test weight (only if an external test weight was used for the test).	<input type="checkbox"/> (deactivated) <input checked="" type="checkbox"/> (activated)*

Difference	Difference between the nominal and actual weight (only if an external test weight was used for the test).	<input type="checkbox"/> (deactivated) <input checked="" type="checkbox"/> (activated)*
Levelcontrol	Indicates whether the balance is correctly leveled.	<input type="checkbox"/> (deactivated)* <input checked="" type="checkbox"/> (activated)
Signature	A further line is printed for signing the protocol.	<input type="checkbox"/> (deactivated) <input checked="" type="checkbox"/> (activated)*

* Factory setting

5.3 Balance information

Navigation: [] > [System] > [Info]

This menu can be used to define an identification for the balance and all balance information can be displayed.

Note

The [Info] function key can be used as a shortcut for the [Show] key.

See Selecting function keys (page 95).

- 1 Tap [Info] and subsequently the associated button.
⇒ Info window is displayed.
- 2 Change the settings and confirm with [OK].
- 3 To exit the menu item, tap [OK].

The following parameters can be defined:

Parameters	Explanation	Values
Balance ID	Defines a designation for the balance (max. 20 characters). This facilitates the identification of individual balances where several balances are used. This identification is also printed in the protocols. Alphanumeric characters can be entered in the input window.	Any
Info	Displays the balance information and built-in options. This information is of particular importance for the service engineer. This information should be available before contacting METTLER TOLEDO customer service.	Show

Note

The balance information can be recorded (provided a printer is connected and activated as an output device in the peripheral device settings) by pressing the [] button.

See Peripherals (page 73).

5.4 Standby

Navigation: [] > [System] > [Standby]

This menu can be used to define the time of balance inactivity after which the balance is automatically set to the standby mode.

Attention

The balance must be unloaded before it can change to standby mode.

Note

Irrespective of the standby mode setting, the display brightness is automatically reduced if the balance remains inactive for 15 minutes. If the displayed value should change during the course of 15 minutes (e.g. due to vibrations), the balance waits a further 15 minutes until the display brightness is reduced.

- 1 Tap [Standby] and subsequently the [Off] button.
⇒ Standby window is displayed.
- 2 Change the settings and confirm with [OK].

3 To exit the menu item, tap **[OK]**.

The following parameters can be defined:

Parameters	Explanation	Values
Standby	Defines the energy saving function The standby mode corresponds to the state the balance assumes after being switched off with the [On/Off] button. The balance can be switched on again by pressing the [On/Off] button.	Off* 30 min. 60 min. 120 min. 240 min.

* Factory setting

5.5 Date/Time

Navigation:  > **[System]** > **[Date/Time]**

This menu can be used to set the date and time.

- 1 Tap **[Date/Time]** and subsequently the associated button.
⇒ **Date/Time** window is displayed.
- 2 Change the settings and confirm with **[OK]**.
- 3 To exit the menu item, tap **[OK]**.

The following parameters can be defined:

Parameters	Explanation	Values
Date format	Sets the date format. D = Day M = Month Y = Year	D.MMM YYYY* MMM D YYYY DD.MM.YYYY MM/DD/YYYY YYYY-MM-DD YYYY/MM/DD
Date	Sets the date and time of the internal clock in the balance. A numeric input window is displayed. Enter the current date in the format day - month - year (DD.MM.YYYY), regardless of the date format selected for the display. Note This setting can also be made directly by tapping the date in weighing mode. A window is displayed in which the date can be directly entered.	Day Month Year
Time Format	Sets the time format.	24:MM* 12:MM 24.MM 12.MM
Time	Sets the time on the balance. M = Minutes Enter the current time in a 24-hour format (24.MM.SS, entry of the seconds is optional), regardless of the time format selected for the display. The input window corresponds to that for the date. The [+1H] and [-1H] keys can also be used for setting the time an hour forward or back. This facilitates switching between summer and winter time. Note This setting can also be made directly by tapping the time display in the weighing mode.	Hours Minutes

* Factory setting

5.6 Peripherals

Navigation:  > **[System]** > **[Peripherals]**

Various peripheral devices can be connected to the balance interface(s). This menu can be used to define the devices to be connected and interface parameters.

Each balance application supports specific peripheral devices. The control of peripheral devices can vary from application to application.

Example

The METTLER TOLEDO programmable relay interface LC-I/O is supported by both **[Statistics]** and **[Piececounting]** applications; however, controlled differently by both applications. More information on the interaction of balance applications with various external devices can be found in the **Solution Guide**, available online at www.mt.com.

There are specific interface setting options for each of these devices. **[Off]** means that no device of this type is connected. **[RS232 built-in]** denotes the default installed RS232C interface. If further optional interfaces are available, these are displayed **[RS232 Option]**. At this point, only the parameters of the default installed RS232C interface are described.

Important

Only a single device can be activated for each available interface; all devices must be deactivated **[Off]**. When a new device is activated, the previously selected device is automatically deactivated.

- 1 Tap **[Peripherals]** and subsequently the associated button.
⇒ **Peripherals** window is displayed.
- 2 Change the settings and confirm with **[OK]**.
- 3 To exit the menu item, tap **[OK]**.

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Parameters	Explanation	Values
Printer	Printer.	Off* RS232 built-in RS232 Option
Host	External computer (bidirectional communication; the balance can send data to the PC and receive commands or data from it).	Off RS232 built-in* RS232 Option
LabX	METTLER TOLEDO LabX software enables the definition of complete dialog-based balance operations and can store and manage measured values as well as further data in a database on the PC.	Off* RS232 built-in Ethernet Option
LabX Controlled Device	This interface is only used with LabX. Connected devices (e.g. LV11 feeder) communicate directly with LabX).	Off* RS232 built-in RS232 Option
Tablet Feeder	METTLER TOLEDO LV11 tablet feeder.	Off* RS232 built-in RS232 Option
Secondary Display	Remote display.	Off* RS232 built-in RS232 Option
Barcode	Barcode scanner.	Off* RS232 built-in RS232 Option
RFID	RFID reader.	Off* RS232 built-in RS232 Option
LC I/O	METTLER TOLEDO programmable relay interface.	Off* RS232 built-in RS232 Option

* Factory setting

Note

Detailed information on optional interfaces and various peripheral devices can be found in the documentation supplied with these products.

When a device has been activated, the interface parameters for communication with this device, e.g. baud rate, data format, stop bits, handshake, end-of-line character, character set and **Continuous mode** (only for peripheral device **Host**) can be defined via the **[Define]** button.

These submenus are always displayed in English, irrespective of the dialog language selected.

The following parameters can be defined:

Parameters	Explanation	Values
Baudrate	Defines the data transfer rate.	600 1200 2400 4800 9600* 19200
Bit / Parity	Defines the number of data bits and parity bits.	7/No 7/Even 7/Odd 8/No*
Stop Bits	Defines the stop bits for data transfer.	1 Stopbit* 2 Stopbits
Handshake	Defines the synchronization for data transfer	None Hardware Xon/Xoff*
End of line	Defines the end-of-line character	<CR><LF>* <CR> <LF>
Char Set	Defines the character set	Ansi/Win* IBM/DOS
Continuous mode	Defines the transfer of weighing data	Off* On

* Factory setting

Information on Continuous mode

In **Continuous mode**, the weighing data is continuously transferred via the interface. The **Continuous mode** is only available for the peripheral device **Host** and default installed RS232C interface **[RS232 built-in]**. When the **Continuous mode** is activated, additional setting options are available.

The following parameters can be defined:

Parameters	Explanation	Values
Output Format	MT-SICS = the data is transferred in MT-SICS format (Mettler Toledo Standard Interface Command Set). MT-SICS operates bidirectional, i.e. the balance can also receive confirmations or commands from the host. A separate reference manual is available for MT-SICS. PM = emulates the data format of PM balances (unidirectional). AT/MT = the data is transferred in the format of METTLER TOLEDO AT and MT balances (unidirectional).	MT-SICS* PM AT/MT
Updates/sec.	Defines the number of datasets transferred via the interface per second.	2 5* 6 10

* Factory setting

5.7 Option

Navigation: [] > **[System]** > **[Option]**

After the installation of specific interface options (e.g. Ethernet), an additional icon is displayed in the system settings. Global interface settings can be made via **[Option]**. These are described in the instructions supplied with the optional interface. This menu item contains only some basic information to help with general communication problems.

Note

These submenus are always displayed in English, irrespective of the dialog language selected.

- 1 Tap **[Option]** and subsequently the associated button.
⇒ **Option** window is displayed.
- 2 Change the settings and confirm with **[OK]**.

3 To exit the menu item, tap **[OK]**.

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Parameters	Explanation	Values
DHCP	Activates/deactivates the Dynamic Host Configuration Protocol. The Dynamic Host Configuration Protocol is used to automatically assign to the client PC a currently unused IP address from an address pool. Other information such as the domain name, standard gateway and specific DNS server can also be transferred to the client.	Off* On
IP-Adress	Defines the IP address in the format "XXX.XXX.XXX.XXX" (X = 0 ... 255). The IP address must be distinctive within a corporate network and conform to the conventions for IP addresses.	Any
Subnet Mask	Defines the subnet in the format "XXX.XXX.XXX.XXX" (X = 0 ... 255). The subnet mask is used to inform the routers within a network which bits in the four quads in the IP address are significant for routing in the search for the addressed computer within a specific network.	Any
Standard Gateway	Defines the Standard Gateway Address in the format "XXX.XXX.XXX.XXX" (X = 0 ... 255). This may be necessary if the network is connected to another network via a router. A gateway denotes the transition between two networks. A gateway computer is a special computer connected to both networks. Different protocols are converted in certain circumstances. A gateway can also be a transition from a logical (often also purely organizational) network to another, whereby both used the same protocol.	Any
Domain Name Server	Defines the Domain Name Server Address in the format "XXX.XXX.XXX.XXX" (X = 0 ... 255). If domain names for calling network users are supported in the TCP/IP network, the domain name server address must be entered here.	Any
Hostname	Defines the computer or server. General computer or server (on which specific user services are normally provided). Often used for the computer to which a data link has been established.	not available

5.8 Administrator

Navigation: [] > **[System]** > **[Administrator]**

This menu can be used to change the administrator ID and password. A general reset of all balance settings can be performed. Access rights for individual users can be allocated and specifications for recording safety-relevant procedures defined.

Note

This menu is protected ex works with an ID and a password.

5.8.1 Configuration of the security system

Navigation: [] > **[System]** > **[Administrator]**

1 Tap **[Administrator]**.

- ⇒ **Protected Area: Enter Administrator ID.** window is displayed.
- 2 Enter the ID. **Factory setting: Z.**
- 3 Confirm with [**OK**].
- ⇒ **Protected Area: Enter Admin. Password.** window is displayed.
- 4 Enter the password. **Factory setting: Z.**
- ⇒ **Administrator** window is displayed.

The arrow buttons can be used to page forward or back to a menu page.

Attention

The ID and password must always be entered in the defined language.

- If the dialog language is changed, it is possible that the access codes cannot be entered.
- If the balance is controlled with commands via an external host, the password protection is deactivated.

Menu item	Explanation	Further information
Administrator ID	Changes the administrator ID.	See Changing the administrator ID and password (page 77)
Administrator Password	Changes the administrator password.	See Changing the administrator ID and password (page 77)
Master Reset	Resets the balance settings to the factory settings.	See Performing a master reset (page 78)
Rights Home	Defines the access rights.	See Definition of user access rights (page 78)
Rights User 1 ... Rights User 7	Defines the access rights.	See Definition of user access rights (page 78)
History	Displays changes to protected settings.	See Recording safety-relevant operations (page 79)
Passw. Change Date	Defines the date for changing a password.	See Reminder function for changing a password (page 80)
Number of users	Defines the number of users.	See Definition of the number of users (page 80)

5.8.1.1 Changing the administrator ID and password

Navigation: [] > [**System**] > [**Administrator**]

The **Administrator ID** and **Administrator Password** menu items can be used to change the ID and password access codes defined by default.

Note

Both an ID and a password must be defined. If the existing code is deleted and no new code is entered, an error message is displayed.

- 1 Tap **Administrator ID** and/or **Administrator Password** and subsequently the associated button.
 - ⇒ The **Administrator ID** and/or **Administrator Password** window is displayed.
- 2 Change the settings and confirm with [**OK**].
- 3 To exit the menu item, tap [**OK**].



CAUTION

Remember IDs and passwords!

- Protected menu areas cannot be accessed without ID or password.
- Note IDs and passwords and keep them in a safe place.

The following parameters can be defined:

Parameters	Explanation	Values
Administrator ID	Creates a new ID or changes an existing ID (max. 20 characters).	Any (Z)*
Administrator Password	Creates new password or changes an existing password (max. 20 characters).	Any (Z)*

* Factory setting

5.8.1.2 Performing a master reset

Navigation: [⚙️] > [System] > [Administrator] > **Master Reset**

This menu item can be used to reset all balance settings to the factory settings. The date and time settings and recorded adjustment operations are not affected.



CAUTION

Data loss after system reset.

After a master reset, the balance is reset to the factory settings. This means that all data such as user and application-specific settings, system settings including administrator ID and password are deleted.

- 1 Tap **Master Reset**.
⇒ **Activate factory settings?** window is displayed.
 - 2 Confirm with [OK].
 - 3 To abort, tap [C].
 - 4 To exit the menu item, tap [OK].
- ⇒ The balance restarts with the factory settings.

The following parameters can be defined:

Parameters	Explanation	Values
Master Reset	Resets the balance to the factory settings.	None

5.8.1.3 Definition of user access rights

Navigation: [⚙️] > [System] > [Administrator] > **Rights Home**

The **Rights Home** and **Rights User 1 ... Rights User 7** menu items can be used to define access rights and select applications for all 8 user profiles.

Note

The user profile designations, e.g. **Rights User 1** correspond to the factory setting; these can be changed in the user-specific settings.

See User (page 85).

- ▶ The user profile is selected.

- 1 Tap [Define].
- 2 Change the settings and confirm with [OK].
- 3 To exit the settings, tap [OK].

After tapping the [Define] button, the menu areas protected with ID and password can be defined for the selected user profile.

The following parameters can be defined:

Parameters	Explanation	Values
Application Set-up	All application-specific settings [⚙️].	No Protection* User Protect. Adm. Protect.

Weighing parameters	All weighing parameters available in the user-specific settings [].	No Protection* User Protect. Adm. Protect.
Adjustweight	Definition of external adjustment weights in the [Adjust/Test] system settings menu	No Protection* User Protect. Adm. Protect.
User	Selects the user profile [].	No Protection* User Protect. Adm. Protect.
User ID/Password	Definition of ID and password in the [User] user-specific settings menu.	No Protection* User Protect. Adm. Protect.
System	All system settings	No Protection* User Protect. Adm. Protect.
User Setting	All user-specific settings [].	No Protection* User Protect. Adm. Protect.
Application	Selects the application [].	No Protection* User Protect. Adm. Protect.
Application Selection	Defines the applications available for the selected user profile.	Weighing* Piece-counting* Percent* Formulation* Titration* Density* Diff.weighing* Pipette Check* Statistics* <input type="checkbox"/> (deactivated) <input checked="" type="checkbox"/> (activated)*

* Factory setting

Protection definition

Values	Explanation
No Protection	The menu area is freely accessible.
User Protect.	A user ID and user password must be entered to display the respective menu area. Note All menu areas protected with a user ID and password can also be opened with the administrator access codes.
Adm. Protect.	An administrator ID and administrator password must be entered to display the respective menu area.

5.8.1.4 Recording safety-relevant operations

Navigation: [] > [**System**] > [**Administrator**] > **History**

The balance is able to document changes to protected settings. The **History** menu item can be used to view a list of these operations and switch recording on or off.

Note

When the memory is full (after about 50 recorded changes), the oldest operation is automatically deleted. If laboratory standards or QA systems require complete traceability of all changes made, the list must be printed and archived from time to time.

The following parameters can be defined:

Parameters	Explanation	Values
History	Displays a list of changes made to protected settings. Specific data is displayed for each change (date and time, user, change made). The list can be printed by pressing the [] key.	Show
Record Mode	Switches recording on or off.	Off* On

* Factory setting

5.8.1.5 Reminder function for changing a password

Navigation: [🔧] > [System] > [Administrator] > **Passw. Change Date**

For security reasons, passwords should be changed regularly; this menu item can be used to define if and when the balance is to generate a reminder to change passwords.

- 1 Select **Request** and subsequently tap the associated button.
⇒ A numeric input window is displayed.
 - 2 Enter the date for the change of password and confirm with [OK].
 - 3 To abort, tap [C].
 - 4 To exit the menu item, tap [OK].
- ⇒ When the selected date is reached, the message **Administrator The password change date has been reached. Please arrange changes** is displayed.

Note

The administrator must ensure that all passwords are changed. The balance does not check this. If the message is deleted with [OK], it is displayed every 3 hours from anew until a new date is defined or the reminder function is deactivated.

The following parameters can be defined:

Parameters	Explanation	Values
Passw. Change Date	Activates/deactivates the reminder function.	Off* On
Request	Enter the date (in DD.MM.YYYY) on which the balance is to generate a reminder to change the password.	None

* Factory setting

5.8.1.6 Definition of the number of users

Navigation: [🔧] > [System] > [Administrator] > **Number of users**

This menu item can be used to define the user profiles available under the [👤] key. The user profile **Home** is not displayed and cannot be deactivated.

- 1 Tap **Number of users** and subsequently the [Define] button.
⇒ The **Number of users** window is displayed.
- 2 Activate or deactivate the user and confirm with [OK].
- 3 Confirm with [OK].
- 4 To abort, tap [C].
- 5 To restore the factory default settings, tap [STD].
- 6 To exit the menu item, tap [OK].

The following parameters can be defined:

Parameters	Explanation	Values
Number of users	Defines the number of users available in the user profile [👤].	User 1* User 2* User 3* User 4* User 5* User 6* User 7* <input type="checkbox"/> (deactivated)* <input checked="" type="checkbox"/> (activated)

* Factory setting

5.9 Level sensor

Navigation: [] > [System] > [Levelcontrol]

The built-in level sensor permanently monitors the balance for correct horizontal alignment. This menu can be used to activate or deactivate the level sensor and define the settings for the generation of warnings within incorrect leveling.

Leveling information, **see** Leveling the balance (page 30).

- 1 Tap [Levelcontrol].
 - ⇒ Levelcontrol window is displayed.
- 2 Tap [Levelcontrol] and subsequently the [Define] button.
 - ⇒ Levelcontrol window is displayed.
- 3 Activate or deactivate the **Warning Text** and/or the **Warning Beep**.
- 4 Confirm with [OK].
- 5 To exit the menu item, tap [OK].

Note

- The level sensor depends on the type of balance
- The level sensor **cannot** be switched off on some balances.
- The level sensor is coupled with the backlighting of the level indicator above the right foot screw. The level indicator is illuminated when the level sensor is activated.

Menu structure

Main menu	Submenu	Further information
Off	no submenu	See Parameter table
Levelcontrol	Warning Text	
	Warning Beep	

The following parameters can be defined:

Parameters	Explanation	Values
Warning Text	Defines whether and how often a warning text is to be displayed if the balance is not precisely leveled.	Off Once* Repeat
Warning Beep	Defines if and how often an audible warning is to be generated if the balance is not precisely leveled.	Off Once* Repeat

* Factory setting

Warning text and audible warning settings

Values	Explanation
Off	If the level is incorrect, only the status icon appears at the top right of the display. No warning text is displayed or audible warning generated.
Once	If the level sensor detects incorrect leveling, the warning text is displayed or the audible warning generated only once.
Repeat	As long as the balance is not correctly leveled, the warning text or audible warning is repeated every 15 minutes.

6 User-specific Settings

Navigation: [👤]

This section describes the procedure for defining specific settings for each user. This allows the balance to be adapted to the respective work technique and specific tasks.

To be noted is that all settings are stored under the active user profile and apply to working with all applications within this profile. It must be ensured that the required user profile is selected. When a user profile is displayed, the associated settings are automatically loaded.

► A printer is connected and activated as an output device in the peripheral device settings.

- 1 To check the user profile, press [👤].
- 2 To print out the settings, press [🖨️].

Note

- The detail of the protocol depends on the point at which printout is activated in the system settings. Press [🖨️] in the uppermost level of the user-specific settings; all settings are recorded. Start printing, e.g. in the [Terminal] submenu; only settings for the terminal are recorded.
 - To display the user-specific settings, press [👤].
- ⇒ The [User Setting] window is displayed.

Example: Printout

```
User Setting
Weighing parameters
Weighing Mode   Universal
Environment     Standard
Value Release
                 Reliable+Fast
AutoZero        On
User
User Name       Home
Language        English
User ID         1
Terminal
Brightness      80
Colour selection
                 PaletteBlueCold
Sound           70
Touch Function  On
Optical key feedback On
Speedread       On
StatusLight
Brightness      60
Green status    On
StatusLight     On
```

6.1 Overview of user-specific settings

The user-specific settings are displayed in the form of symbols. The individual settings can be displayed and changed by tapping the symbols.

Note

If this menu has been protected by the administrator, the appropriate ID and password must be entered.

- The user profile is selected.
- 1 Tap, e.g. [Terminal].
⇒ **Terminal** window is displayed.

- 2 Select the required menu item (e.g. **Sound**).
- 3 Change the settings and confirm with [**OK**].
- 4 To abort, tap [**C**].
- 5 To exit the menu item, tap [**OK**].
- 6 To exit the [**User Setting**], tap [**Exit**] or press [].

	Designation	Explanation
	Wghparam	Settings for adjusting the balance to specific weighing conditions.
	User	Settings for the 8 different user profiles with respective information (e.g. name, password, dialog language).
	Door	Settings for the motorized glass draft shield (depending on type).
	Terminal	Settings for the display (e.g. brightness) and for the behavior of the terminal.
	User Reset	Reset all settings for the user profile to the factory settings.

Menu structure

Main menu	Submenu	Further information
Wghparam	Weighing Mode	See Weighing parameters (page 83)
	Environment	
	Value Release	
	AutoZero	
User	User Name	See User (page 85)
	Language	
	User ID	
	Password	
Door	Door Function	See Doors (page 87)
	Doorway	
Terminal	Brightness	See Terminal (page 88)
	Colour selection	
	Sound	
	Touch Function	
	Touchadjust	
	Optical key feedback	
	Speedread	
	StatusLight	
User Reset	no submenu	See User factory settings (page 91)

6.2 Weighing parameters

Navigation: [] > [**Wghparam**]

This menu can be used to adapt the balance to suit specific requirements.

- 1 Tap [**Wghparam**] and subsequently the associated button.
- 2 Settings can be changed by tapping the associated button.
- 3 To exit the menu item, tap [**OK**].

Note

If access to this menu has been protected by the administrator, the appropriate ID and password must be entered.

The following parameters can be defined:

Menu item	Explanation	Further information
Weighing Mode	Adapts the balance to the weighing mode.	See Weighing mode (page 84)
Environment	Adapts the balance to the ambient conditions and location.	See Ambient conditions (page 84)
Value Release	Defines how quickly a stable measured value is recognized by the balance as stable and released.	See Measured value release (page 85)
AutoZero	Activates/deactivates automatic zero correction.	See AutoZero (page 85)

6.2.1 Weighing mode

Navigation: [] > [Wghparam] > **Weighing Mode**

This setting can be used to adapt the balance to the weighing mode.

The following parameters can be defined:

Parameters	Explanation	Values
Weighing Mode	Defines the weighing mode.	Universal* Dosing Sensor Mode Checkweighing

* Factory setting

Weighing mode settings

Note

The number of available settings depends on the type of balance.

Values	Explanation
Universal	For all standard weighing applications.
Dosing	For dosing liquid or powdery products. With this setting, the balance responds very quickly to the smallest changes in weight.
Sensor Mode	Depending on the setting of the ambient conditions, this setting delivers a filtered weighing signal of varying strength. The filter has a linear characteristic in relation to time (not adaptive) and is suitable for continuous measured value processing.
Checkweighing	With this setting, the balance only reacts to significant changes in weight and the result is very stable.

6.2.2 Ambient conditions

Navigation: [] > [Wghparam] > **Environment**

With this setting, the balance can be optimally adapted to the ambient conditions at locations.

The following parameters can be defined:

Parameters	Explanation	Values
Environment	Defines the ambient conditions	Very stable Stable Standard* Unstable Very unstable

* Factory setting

Settings for ambient conditions

Note

The number of available settings depends on the type of balance.

Values	Explanation
Very stable	For working in an environment that is free from drafts and vibrations.

Stable	For working in an environment that is virtually free from drafts and vibrations.
Standard	This setting corresponds to an average working environment subject to significant fluctuations of the ambient conditions.
Unstable	For an environment subject to constantly changing conditions.
Very unstable	For an environment with changing conditions.

6.2.3 Measured value release

Navigation: [] > [Wghparam] > Value Release

This setting can be used to define how quickly a measured value is recognized as stable by the balance and released.

The following parameters can be defined:

Parameters	Explanation	Values
Value Release	Defines measured value release.	Very fast Fast Reliable+Fast* Reliable Very reliable

* Factory setting

Measured value settings

Values	Explanation
Very fast	For very fast results where repeatability is of less importance.
Fast	For fast results where repeatability is of less importance.
Reliable+Fast	This setting corresponds to an average stabilization time and repeatability.
Reliable	For good repeatability of measured results, the stabilization time is longer.
Very reliable	For very good repeatability of measured results, the stabilization is longer.

6.2.4 AutoZero

Navigation: [] > [Wghparam] > AutoZero

This menu item can be used to switch the automatic zero correction on or off.

Note

This menu item is not available for approved balances (e = d).

The following parameters can be defined:

Parameters	Explanation	Values
AutoZero	Defines the ambient conditions	Off On*

* Factory setting

Settings for automatic zero correction

Values	Explanation
Off	The automatic zero correction is switched off.
On	The automatic zero correction [AutoZero] continuously corrects zero deviations, e.g. that can occur due to slight fouling of the weighing pan.

6.3 User

Navigation: [] > [User]

This menu can be used to define the user name, dialog language and user access codes.

- 1 Tap [User] and subsequently the associated button.
- 2 The settings can be changed by tapping the associated button or confirming with [OK].
- 3 To exit the menu item, tap [OK].

The following parameters can be defined:

Menu item	Explanation	Further information
User Name	The name of the current user profile can be changed here.	See
Language	Defines the dialog language.	See
User ID	Change the user ID.	See User ID and password (page 87)
Password	Change the user password.	

6.3.1 User name

Navigation: [👤] > [User] > **User Name**

The name of the current user profile can be changed in this menu item. Alphanumeric characters can be entered in the input window.

Note

If the entered user name already exists, an error message is displayed. After changing the name, the user profile appears at the top left of the display and in the profile menu [👤] under the new name. The user name is also printed in the protocols.

▶ The user profile is selected.

- Under **User Name**, tap the associated button.
⇒ An alphanumeric input window is displayed.
- Enter the designation and confirm with [OK].
- To exit the menu item, tap [OK].

The following parameters can be defined:

Parameters	Explanation	Values
User Name	Changes the name of the current user profile (max. 20 characters).	Any e.g. (User 1)*

* Factory setting

6.3.2 Language

Navigation: [👤] > [User] > **Language**

This menu item can be used to select the dialog language. The language is changed immediately. All windows and messages are displayed in the selected language.

Exception: interface parameters in the system settings are always in English.

Note

If the dialog language is changed, it is possible that administrator and user access codes (password and ID) cannot be entered. The ID and password must therefore always be entered in the defined language!

▶ The user profile is selected.

- Tap **Language** on the associated button.
⇒ A selection window is displayed.
- Tap the preferred language.
- To exit the menu item, tap [OK].

The following parameters can be defined:

Parameters	Explanation	Values
Language	Defines the preferred language. Note The language is normally preset for the country of use.	English Deutsch Français Español Italiano Russian Katakana Polski Cestina Magyar Chinese Japanese

6.3.3 User ID and password

Navigation: [] > [User] > **User ID** or **Password**

The current user access codes can be changed in these two menu items with identical dialogs. These codes are required for accessing menu areas that have been protected at user level by the administrator

If an existing ID or password is deleted and no new code is entered, an error message is displayed.

Note

If access to both of these menu items is protected by the administrator, the current ID and password must be entered before the code can be changed.

- ▶ The user profile is selected.
- 1 Under **User ID** or **Password** tap the associated button.
 - ⇒ An alphanumeric input window is displayed.
- 2 Enter the designation and confirm with [**OK**].
- 3 To exit the menu item, tap [**OK**].

The following parameters can be defined:

Parameters	Explanation	Values
User ID	Changes the existing current user profile ID (max. 20 characters).	Any (Home = 0 User 1 = 1 User 2 = 2 User 3 = 3 User 4 = 4 User 5 = 5 User 6 = 6 User 7 = 7)*
Password	Changes the existing current user profile password (max. 20 characters).	Any (Home = 0 User 1 = 1 User 2 = 2 User 3 = 3 User 4 = 4 User 5 = 5 User 6 = 6 User 7 = 7)*

* Factory setting

6.4 Doors

Navigation: [] > [Door]

This menu can be used to adapt the function of the glass draft shield doors to suit specific requirements.

- ▶ The user profile is selected.
- 1 Tap [**Door**].
 - ⇒ **Door** window is displayed.
- 2 Select the required menu item (e.g. **Door Function**).
 - ⇒ A selection window is displayed.
- 3 Change the setting.
- 4 To exit the menu item, tap [**OK**].

Menu structure

Main menu	Submenu	Further information
Door Function	Manual	See Section Door function
	Automatic	

Doorway	100 %	See Section Door opening
	75 %	
	75 %	
	25 %	

Door Function

The operation of the door function can be defined with this setting.

The following parameters can be defined:

Parameters	Explanation	Values
Door Function	Activates/deactivates the draft shield door function.	Manual* Automatic

* Factory setting

Door function settings

Values	Explanation
Manual	The draft shield (doors) must be opened or closed manually. With the  keys, via SmartSens or manually.
Automatic	Opens and closes the glass draft shield doors automatically when required.

Note

Information on configuration of SmartSens, **see** Settings for SmartSens and ErgoSens (page 112).

The door function [**Automatic**] is not compatible with [**Detection mode**] [**Automatic**] the electrostatic detection, **see** Settings for electrostatic detection (page 113). If both [**Automatic**] options are selected, the electrostatic detection has priority, i.e. the doors are not automatically operated.

Example

- When the  button is pressed, the doors open automatically for loading the tare weight.
- When a request is made to load the adjustment weight while adjusting the balance, the doors open automatically. The doors close automatically when the weight is loaded.
- The glass draft shield closes automatically for all weighings to achieve a stable weight indication.
- For different operations (e.g. piece counting), the doors open and close automatically as required by the application.

Doorway

If the application permits, the door opening angle can be reduced. This shortens opening and closing times, reducing environmental influences (e.g. drafts).

The following parameters can be defined:

Parameters	Explanation	Values
Doorway	Defines the extent to which the glass draft shield doors can be opened (automatically or manually).	100 %* 75 % 50 % 25 %

Door opening settings

Values	Explanation
100 %	Opens the door fully.
75 %	Opens the doors three quarters.
50 %	Opens the doors halfway.
25 %	Opens the doors a quarter.

6.5 Terminal

Navigation:  > [**Terminal**]

This menu can be used to adapt the terminal to suit specific requirements and the display adjusted.

- ▶ The user profile is selected.

- 1 Tap [**Terminal**].

- ⇒ **Terminal** window is displayed.
- 2 Select the required menu item, e.g. **Brightness** and subsequently tap the associated button.
 - ⇒ **Brightness** window is displayed.
- 3 Tap the plus or minus arrow key and confirm with **[OK]**.
- 4 To exit the menu item, tap **[OK]**.

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Menu item	Explanation	Further information
Brightness	Adjusts the display brightness.	See Brightness (page 89)
Colour selection	Selects the display color.	See Color selection (page 89)
Sound	Set the beep volume.	See Beep (page 90)
Touch Function	Activates/deactivates the display touch function	See Touch function (page 90)
Touchadjust	Activates/deactivates the touch screen adjustment.	See Touch adjustment (page 90)
Optical key feedback	Activates/deactivates the visual feedback.	See Optical key feedback (page 90)
Speedread	Activates/deactivates the weighing result display color selection.	See Speedread (page 91)
StatusLight	Activates/deactivates the status indicator. Defines the brightness.	See Status indicator (page 91)

6.5.1 Brightness

Navigation: [] > [**Terminal**] > **Brightness**

This menu item can be used to adjust the display brightness. The brightness is adjusted in 20% steps each time one of the two arrow keys is tapped.

The following parameters can be defined:

Parameters	Explanation	Values
Brightness	Adjusts the display brightness (in 20% steps).	20 % ... 100 % (80 %)*

* Factory setting

6.5.2 Color selection

Navigation: [] > [**Terminal**] > **Colour selection**

This menu item can be used to adjust the display color. The colors can be used for orientation. Different colors can be used for user profiles for easy identification of a currently active profile. There are a total of 8 different colors. 4 different colors with low (left column) or high (right column) contrast.

Note

The high contrast colors make the display easier to read in poor lighting conditions.

The following parameters can be defined:

Parameters	Explanation	Values
Colour selection	Color adjustment.	Color 1* Color 2 Color 3 Color 4 Color 5 Color 6 Color 7 Color 8 (color 1, blue with low contrast)*

* Factory setting

6.5.3 Beep

Navigation: [] > [Terminal] > **Sound**

This menu item can be used to adjust the beep volume. The volume is increased in 10% steps each time one of the two arrow keys is tapped. Setting the volume to 0% switches off the beep.

The following parameters can be defined:

Parameters	Explanation	Values
Sound	Adjusts the volume (in 10% steps)	0 % ... 100 % (70 %)*

* Factory setting

6.5.4 Touch function

Navigation: [] > [Terminal] > **Touch Function**

This menu item can be used to activate or deactivate the touch screen touch function. If the **[Touch Function]** is deactivated, the display will no longer respond to touch in weighing mode. Settings can no longer be made by tapping the display (exception: function keys).

Important

The touch function is always active in setting mode to allow settings to be made.

The following parameters can be defined:

Parameters	Explanation	Values
Touch Function	Activates/deactivates the touch screen touch function.	On* Off

* Factory setting

6.5.5 Touch adjustment

Navigation: [] > [Terminal] > **Touchadjust**

If the instrument does not respond correctly when a certain area of the display is tapped, the touch screen can be adjusted with **[Touchadjust]**.

- 1 Tap **[Activate]**.
⇒ A window is displayed.
- 2 Tap the flashing area. This procedure must be repeated several times.
- 3 The procedure can be interrupted at any time by tapping **[C]**.
⇒ When all flashing areas have been selected, the window closes.

6.5.6 Optical key feedback

Navigation: [] > [Terminal] > **Optical key feedback**

A short beep is generated each time a button is pressed or a menu function initiated as confirmation.

For additional visual feedback, the **[Optical key feedback]** function can be activated. When the beep sounds, the yellow LEDs on the right and left at the bottom of the status bar also light up briefly on the terminal.

The following parameters can be defined:

Parameters	Explanation	Values
Optical key feedback	Activates/deactivates the visual feedback.	Off* On

* Factory setting

6.5.7 Speedread

Navigation: [🔧] > [Terminal] > **Speedread**

If this function is activated, the weighing result is displayed in a light color as long as it remains unstable. The result is displayed in a darker color when it is stable. If the [**Speedread**] function is deactivated, the weighing result is always displayed in the same color, irrespective of whether it is stable or not.

The following parameters can be defined:

Parameters	Explanation	Values
Speedread	Activates/deactivates the color display of the weighing result.	Off* On

* Factory setting

6.5.8 Status indicator

Navigation: [🔧] > [Terminal] > **StatusLight**

New intelligent safety tools monitor the balance ready status. This menu item can be used to activate or deactivate the status indicator. The built-in status indicator in the terminal shows that the balance is ready to use.

The following parameters can be defined:

Parameters	Explanation	Values
Brightness	Adjusts the display brightness (in 10% steps).	10 % ... 100 % (60 %)*
Green status	Activates/deactivates the green status icon. If the green status icon is deactivated, the status indicator does not light up when the balance is ready to use. The other status icons (flashing green, yellow, red) are displayed as normal.	Off On*
StatusLight	Activates/deactivates the status indicator. Green = balance is ready to use. Flashing green = balance is busy. Example: Internal adjustment in progress. Yellow = task pending, balance can still be used. Example: Automatic internal adjustment pending. Red = balance cannot/must not be used. Example: Balance is not correctly leveled.	Off On*

* Factory setting

6.6 User factory settings

Navigation: [🔧] > [**User Reset**]

This menu can be used to reset all settings for an active user profile to the factory settings.



CAUTION

Data loss after user profile reset

After a reset, the balance is reset to the factory settings. All user and application-specific settings for the active user profile are reset to the factory settings. All individual settings, including user ID and password as well as measured values are deleted!

- ▶ The user profile is selected.
- 1 Tap [**User Reset**].
 - ⇒ **User Reset** window is displayed.

- 2 Confirm with [**OK**].
 - 3 To abort, tap [**C**].
- ⇒ The balance restarts with the factory settings.

7 Weighing Application

Navigation:  > [Weighing]



This section provides information and descriptions of setting options for practical use of the application.

All application settings are saved under the active user profile. Each user can select specific settings for this application. It must be ensured that the required user profile is selected.

Selecting the application

- 1 Press .
- 2 Tap the [Weighing] icon in the selection window.
 - ⇒ The selected application is active.
 - ⇒ The balance is ready for weighing.

7.1 Weighing application settings

Navigation:  > [Weighing] > 

The procedure for performing a simple weighing has already been described, **see** Weighing for the first time (page 30). In addition to the described procedures (zeroing, taring and performing a simple weighing), the balance offers a number of options for adjusting the application to suit specific requirements.

- 1 Press .
- ⇒ A window with application-dependent settings is displayed.
- 2 Select the required menu item (e.g. **Function Keys**).
- 3 Change the settings and confirm with [OK].
- 4 To exit the menu without saving, tap [C].
- 5 To restore the factory default settings, tap [STD].
- 6 To exit the menu item, tap [OK].

The arrow buttons can be used to page forward or back to a menu page.

Note

Settings can be printed out at any time in the application-dependent settings menu.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

Example: Printout

Weighing	
Function Keys	
ID	-
Nominal	-
+Tol	-
-Tol	-
Lotcounter	-
Adjust.int	1
Adjust.ext	-
Test int	-
Test ext	-
PreTare	-
Tare Store	-

The following parameters can be defined:

Menu item	Explanation	Further information
Function Keys	Definition of function keys to appear at the bottom of the display. These keys enable direct access to specific functions.	See Selecting function keys (page 95)
SmartTrac	Definition of the appearance of the graphic weighing-in aid.	See Selecting SmartTrac (page 97)
Info Field	Definition of information fields to be displayed.	See Selecting information fields (page 97)
AutoPrint	Activates/deactivates automatic weighing result printout.	See Specifications for automatic protocol printout (page 98)
Display Unit	Definition of unit for result display.	See Selecting weighing units (page 99)
Info Unit	Definition of an additional weighing unit. This appears in the respective display information field.	See Selecting weighing units (page 99)
Custom Unit 1	Definition of a specific weighing unit.	See Defining free weighing units (page 99)
Custom Unit 2	Definition of a second specific weighing unit.	See Defining free weighing units (page 99)
Protocol	Selects data to be shown in the weighing protocols.	See Protocol definition (page 100)
Print key	Definition of the behavior of the  key for manual weighing result printout.	See Specifications for manual protocol printout (page 104)
Transfer Key	Formats data output via the [Transfer] function key.	See Output data formatting (transfer key) (page 104)
Identification	Defines identifications.	See Definition of identifications and protocol headers (page 107)
Barcode	Defines how barcode data is processed. These settings are only relevant if a barcode scanner is connected.	see Instructions for processing barcode data (page 108)
RFID	Defines how RFID data is processed. These settings are only relevant if a RFID reader is connected.	see Instructions for processing RFID data (page 109)
MinWeigh	Activates/deactivates the minimum weight function. The minimum weight function ensures that the weighing results are within defined tolerances appropriate to the requirements of your quality assurance system.	See MinWeigh function settings (page 109)
Tare Store	Predefines up to 10 selectable tare weights.	See Tare memory definition and activation (page 110)
AutoTare	Activates/deactivates the tare function. The automatic tare function automatically stores the first stable weight as the tare weight.	See Automatic taring function settings (page 111)
Smart & ErgoSens	Programs both terminal SmartSens sensors. Up to two external ErgoSens (optional) can be assigned a function in this menu.	See Settings for SmartSens and ErgoSens (page 112)
AntiStatic Kit	Settings for the optional anti-static kit (ionizer) for eliminating the build-up of electrostatic charges on weighing objects.	See Settings for the optional anti-static kit (ionizer) (page 113)
ES-Detection	Settings for electrostatic detection	See Settings for electrostatic detection (page 113)

7.1.1 Selecting function keys

Navigation:  > [Weighing] >  > **Function Keys**

Function keys enable direct access to specific functions and settings in the application. A function can be activated by tapping a key.

The numbered function keys are displayed in the application at the bottom of the display. The numbers define the sequence in the display.

- Activate or deactivate function keys by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.

The arrow buttons can be used to page forward or back to a menu page.

► Application is activated.

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **Function Keys**, tap the [Define] button.
- 3 Select a function key by tapping.
 - ⇒ The function key is automatically numbered.
- 4 Change the settings and confirm with [OK].
- 5 To restore the factory default settings, tap [STD].
- 6 To exit the menu item, tap [OK].

7.1.1.1 Function key overview

	Designation	Explanation
	ID	This function key can be used for the assignment of individual weighing identifications (descriptive texts), which are also shown in the protocols. After tapping this function key, a window is displayed in which the ID can be selected and text entered. Information for the definition of identifications, see Definition of identifications and protocol headers (page 107). Information on practical working with identifications, see Working with identifications (page 116).
	Nominal	Definition of the required nominal weight. This also serves as a reference for the tolerances. Information on nominal weight settings, see Weighing-in to a nominal weight (page 117).
	+Tol	Definition of accuracy (tolerances) for weighing-in to a nominal weight. Information on tolerance settings, see Weighing-in to a nominal weight (page 117).
	-Tol	Definition of accuracy (tolerances) for weighing-in to a nominal weight. Information on tolerance settings, see Weighing-in to a nominal weight (page 117).
	Lot counter	Activates the lot counter and defines a start value. Information on settings, see Working with the lot counter (page 116).
	Adjust.int	Balance adjustment with internal adjustment weight. Information on making and recording adjustments, see Adjustment with internal weight/ProFACT (page 120).

	Adjust.ext	Balance adjustment with an external adjustment weight. Information on making and recording adjustments, see Adjust-ment with external test weight (page 120). Note External adjustment is not available on certain legal-for-trade bal-ances.
	Test int	Balance adjustment test with an internal test weight. Information on performing and recording tests, see Testing the adjustment with internal weight (page 121).
	Test ext	Testing balance adjustment with an external test weight. Information on performing and recording tests, see Testing the adjustment with external test weight (page 122).
	PreTare	Numerical entry of a fixed tare weight (subtraction of tare weight). Information on tare weight entry, see Taring options (page 115).
	Tare Store	Displaying a predefined tare weight. Information on the definition of predefined tare weights, see Tare memory definition and activation (page 110). Information on practical working with the tare memory, see Tar-ing options (page 115).
	1/2d ... 1/1000d	Changes the resolution of the weighing result. Information on resolution adjustment, see Changing the weighing result resolution (page 114). Note For calibration reasons, resolution selection is not available on certain legal-for-trade balances.
	Header	Prints the protocol header. Information on weighing protocol settings, see Protocol definition (page 100).
	Footer	Prints the protocol footer. Information on weighing protocol settings, see Protocol definition (page 100).
	Adj. History	Displays the adjustment history. Note Adjustments made in the system settings are displayed. Information on settings, see Settings for adjustments and tests (page 43).
	Transfer	Transfers the current weight, without further data (additional infor-mation) directly to a connected host computer. The output data can be formatted. Information on output data formatting, see Output data formatting (transfer key) (page 104).
	Test Sequence	Displays a list of tasks set to [Manual]. Information on adjustments, see Assigning a test sequence to a task. (page 63).
	Info	This function key is used as a shortcut for the [Show] key. Information on adjustments, see Balance information (page 72).
	GWP History	Opens the history. All test results saved in the GWP history are displayed. Information on history settings, see Test history (page 70).
	Ionizer	Starts/stops the connected ionizer, see Settings for electrostatic detection (page 113).

	ES-Det.	Manually starts the measurement of samples for electrostatic charges, see Settings for electrostatic detection (page 113).
	Detection threshold	This function key is used as a shortcut for entering the switching threshold, see Settings for electrostatic detection (page 113).

Factory setting: [Adjust.int] and [1/10d] activated.

7.1.2 Selecting SmartTrac

Navigation:  > [Weighing] >  > SmartTrac

SmartTrac is a graphic remaining range display. It displays the already used and remaining weighing range. In certain applications, SmartTrac also facilitates weighing-in to a specific nominal weight.

SmartTrac is displayed below the weighing result on the right of the display, **see** Display (page 18).

- 1 Press .
 - ⇒ Window with application-dependent settings is displayed.
- 2 Tap the corresponding button.
- 3 Change the setting.
- 4 To exit the menu item, tap [OK].

Note

This menu can also be displayed directly from the application by tapping SmartTrac.

The following parameters can be defined:

Parameters	Explanation	Values
SmartTrac	Activates/deactivates SmartTrac or defines the display mode.	No SmartTrac  * 

* Factory setting

7.1.3 Selecting information fields

Navigation:  > [Weighing] >  > Info Field

The information fields in the display provide constant information on, e.g. set values, measured results.

The numbered fields are displayed in the application. The numbers define the information field sequence in the display (maximum 4 information fields).

- Information fields can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all information fields must be deactivated and then activated in the required sequence.

► Application is activated.

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **Info Field**, tap the [Define] button.
- 3 Select **Info Field** by tapping.
 - ⇒ The information field is automatically numbered.
- 4 Change the settings and confirm with [OK].
- 5 To restore the factory default settings, tap [STD].
- 6 To exit the menu item, tap [OK].

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Values	Explanation
Nominal	This function key displays the nominal weight.
+Tol	This function key displays the entered tolerance for weighing-in to nominal weight.
-Tol	This function key displays the entered tolerance for weighing-in to nominal weight.
Lot counter	Displays the item counter status.
ID1	Displays the identification entered via the [ID] function key. Note Instead of ID1 , the defined designation is displayed, see Definition of identifications and protocol headers (page 107).
ID2	Displays the identification entered via the [ID] function key. Note Instead of ID2 , the defined designation is displayed, see Definition of identifications and protocol headers (page 107).
ID3	Displays the identification entered via the [ID] function key. Note Instead of ID3 , the defined designation is displayed, see Definition of identifications and protocol headers (page 107).
ID4	Displays the identification entered via the [ID] function key. Note Instead of ID4 , the defined designation is displayed, see Definition of identifications and protocol headers (page 107).
Info Unit	Displays the weighing result in the second selected weighing unit, see Selecting weighing units (page 99).
Tare	Displays the current tare value (in the same unit of weight as the weighing result in the main display).
Gross	Displays the current gross weight (in the same unit of weight as the weighing result in the main display).
RefTare	If the [MinWeigh] function is activated, this information field displays the upper reference tare limit. Information on minimum weight settings, see MinWeigh function settings (page 109).
MinWeigh	If the [MinWeigh] function is activated, this information field displays the required minimum weight based on the reference tare. Information on minimum weight settings, see MinWeigh function settings (page 109).
MW-Method	If the [MinWeigh] function is activated, this information field displays which of the three MW methods are used for the QA standard. Information on minimum weight settings, see MinWeigh function settings (page 109).

7.1.4 Specifications for automatic protocol printout

Navigation:  > [Weighing] >  > AutoPrint

This menu item can be used to define whether and under which conditions the balance automatically records the weighing result. Information defined for recording single values is printed.

See Protocol definition (page 100).

When this function is activated [On], the criteria for automatic entry can be defined via the [Define] button.

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **Autom. WeightEntry**, tap the associated button.
 - ⇒ **Autom. WeightEntry** window is displayed.
- 3 Tap [On] and subsequently the [Define] button.

4 Change the settings and confirm with [OK].

5 To exit the menu item, tap [OK].

The following parameters can be defined:

Parameters	Explanation	Values
Limit	For automatic protocol printout, the defined limits must not be reached and subsequently exceeded.	any
Delay time	When the limits are exceeded, the [Delay time] starts, after lapse of which the weight is recorded. With this setting, the weighing result can be printed with a defined delay if necessary.	any (displayed in seconds)

Factory setting: [Off] Automatic entry disabled.

7.1.5 Selecting weighing units

Navigation:  > [Weighing] >  > **Display Unit** or **Info Unit**

The menu items **Display Unit** and **Info Unit** can be used to define the weighing units to be used. The weighing result can simultaneously be displayed in two different weighing units by selecting different units. The same units are available for selection under both menu items.

After changing the **Display Unit**, the current weighing result as well as the values in the information fields **Tare** and **Gross** are displayed in the new weighing unit. The **Info Unit** is used for the information field with the same name.

See Selecting information fields (page 97).

Note

- The number of available units is model-dependent.
- All available units are either displayed together or shown as a rolling list.

1 Press .

⇒ A window with application-dependent settings opens.

2 Under **Display Unit** or **Info Unit** tap the associated button.

⇒ A selection window is displayed.

3 Settings can be changed by tapping the associated button.

4 To exit the menu item, tap [OK].

The following parameters can be defined:

Parameters	Explanation	Values
Display Unit	Defines the unit (model-dependent).	g kg ct lb oz ozt GN dwt mom msg t1h t1s t1t tola baht
Info Unit	Defines the unit (model-dependent).	g kg ct lb oz ozt GN dwt mom msg t1h t1s t1t tola baht

Factory setting: Model-dependent, for both units.

7.1.6 Defining free weighing units

Navigation:  > [Weighing] >  > **Custom Unit 1** or **Custom Unit 2**

A specific weighing unit can be defined under the menu items **Custom Unit 1** and **Custom Unit 2**. This allows calculations (e.g. surfaces or volumes) to be carried out directly during determination of the weighing result. The free weighing units are available in all menus and input fields in which weighing units can be selected (however, not for the entry of manual tare weights).

1 Press .

- ⇒ A window with application-dependent settings is displayed.
- 2 Under **Custom Unit 1** or **Custom Unit 2** tap the **[Off]** button.
 - ⇒ **Custom Unit 1** or **Custom Unit 2** window is displayed.
- 3 Tap **[On]** and subsequently the **[Define]** button.
 - ⇒ A selection window is displayed.
- 4 The settings can be changed by tapping the associated button or confirming with **[OK]**.
- 5 To exit the menu item, tap **[OK]**.

The following parameters can be defined:

Parameters	Explanation	Values
Formula	<p>Defines how subsequently defined value for [Factor] is calculated. There are 2 formulae available, where F stands for the factor and net for the weight.</p> <p>F * Net = multiplies the net weight by the factor.</p> <p>F / Net = factor is divided by the net weight.</p> <p>The formula can be used, for example, to simultaneously take into account a known error factor while weighing.</p>	F * Net F / Net
Factor	<p>Definition with which factor ($-10^7 \dots 10^7$) the effective weighing result (net weight) is calculated (via the previously selected formula).</p>	Any
Name	<p>Define a designation for the free weighing unit (max. 4 characters).</p> <p>Note The entry of weighing units (e.g. [g], [kg]) is not permitted and results in the generation of an error message.</p>	Any
Result Output Format	<p>Defines the formatting for the weighing result.</p> <p>Example A setting of "0.05" defines 2 places after the decimal point with rounding to 5. A determined result of 123.4777 is consequently displayed as 123.50.</p> <p>Note This function can only be used to reduce the resolution of the weighing result. No value must therefore be entered that exceeds the maximum balance resolution! Values that are too small are automatically rounded off.</p>	Any

Factory setting: **[Off]**.

7.1.7 Protocol definition

Navigation:  > **[Weighing]** >  > **Protocol**

This menu item can be used to define information to appear in the protocols. This extensive menu is divided into 3 submenus in which options for the header, recording of single values and the footer can be defined.

The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.

► Application is activated.

- 1 Press .

- ⇒ A window with application-dependent settings is displayed.
- 2 Under **Protocol**, tap the [**Define**] button.
 - ⇒ **Protocol** window is displayed.
- 3 Under (e.g. **Header**), tap the [**Define**] button.
- 4 Select an information key by tapping.
 - ⇒ The information key is automatically numbered.
- 5 To restore the factory default settings, tap [**STD**].
- 6 To exit the menu item, tap [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

Note

The results and data can be printed out at any time.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [☰].

Example: Printout

Header / Footer

```

----- Weighing -----
25.Jul 2013          17:30
T1
T2
User Name           User 1
Balance Type        XPE204
Balance ID          Lab A/1
ID1
Balance is levelled
Nominal             0.00 g
+Tol                2.50 %
-Tol                2.50 %
MW-Method           Off
Min.Weight by Tare
-----
Signature
.....

```

Single value

```

----- Weighing -----
25.Jul 2013          17:05
      N             121.53 g
      T             41.37 g
      G             162.90 g
-----

```

The following parameters can be defined:

Menu item	Explanation	Further information
Header	Define the information to be printed in the protocol header (before the results).	See Protocol header
Single value	Define the information to be recorded for each single result.	See Recording single values
Footer	Define information to be printed in the protocol footer after the results (single values).	See Protocol footer

Header line of protocols

This submenu can be used to define information to be printed in the protocol header (before the results). The header is automatically printed if it has been defined as part of the protocol.

However, the header can also be printed separately by tapping the [**Header**] function key.

The following parameters can be defined:

Values	Explanation
Appl. Name	The application name is printed.

Title 1	The defined protocol header is printed, see Definition of identifications and protocol headers (page 107).
Title 2	The defined protocol header is printed, see Definition of identifications and protocol headers (page 107).
Date/Time	The current date and time are printed.
User	The name of the current user is printed.
Balance Type	The balance type is printed. The balance type is generated by the balance and cannot be changed by the user.
SNR	The serial numbers of the balance and terminal are printed. The serial numbers of the balance and terminal are generated by the balance and cannot be changed.
Balance ID	The balance identification defined in the system settings is printed.
Levelcontrol	Records whether or not the balance is correctly leveled.
ID1	The identification defined via the function key is printed. Information on practical working with identifications, see Working with identifications (page 116).
ID2	The identification defined via the function key is printed. Information on practical working with identifications, see Working with identifications (page 116).
ID3	The identification defined via the function key is printed. Information on practical working with identifications, see Working with identifications (page 116).
ID4	The identification defined via the function key is printed. Information on practical working with identifications, see Working with identifications (page 116).
Nom.,+Tol,-Tol	Recorded the defined nominal weight and the defined plus and minus tolerances.
MW-Method	Records the selected method for the minimum weight. Information on minimum weight settings, see MinWeigh function settings (page 109).
Signature	Inserts a line block for signing the protocol.
Blank Line	A blank line is printed.
Dash Line	Inserts a dashed dividing line (this option is available twice).
3 Blank Lines	Prints 3 space lines at the end of the protocol (paper feed).

Factory setting: **Appl. Name** and **Date/Time** enabled in this order.

Recording of single values

This submenu can be used to define the information to be recorded for each individual result.

Printing takes place by pressing the  key or automatically if the automatic print function is activated.

See Specifications for automatic protocol printout (page 98).

The following parameters can be defined:

Values	Explanation
Appl. Name	The application name is printed.
Levelcontrol	Records whether or not the balance is correctly leveled.
ID1	The identification defined via the function key is printed. Information on practical working with identifications, see Working with identifications (page 116).

ID2	The identification defined via the function key is printed. Information on practical working with identifications, see Working with identifications (page 116).
ID3	The identification defined via the function key is printed. Information on practical working with identifications, see Working with identifications (page 116).
ID4	The identification defined via the function key is printed. Information on practical working with identifications, see Working with identifications (page 116).
Nom.,+Tol,-Tol	Recorded the defined nominal weight and the defined plus and minus tolerances.
MW-Method	Records the selected method for the minimum weight. Information on minimum weight settings, see MinWeigh function settings (page 109).
Tare	The tare weight of the current weighing is printed.
Net	The net weight of the current weighing is printed.
Gross	The gross weight of the current weighing is printed.
Info Unit	The weighing result (net weight) is additionally printed in the selected information unit.
ES-Detection	The electrostatic detection status is printed.
Signature	Inserts a line block for signing the protocol.
Blank Line	A blank line is printed.
Dash Line	Inserts a dashed dividing line (this option is available twice).
3 Blank Lines	Prints 3 space lines at the end of the protocol (paper feed).
Footer	The defined information for the footer is printed.

Factory setting: Net enabled.

Protocol footer

This submenu can be used to define the information to be printed in the protocol footer after the results (single values).

The footer can be printed by tapping the [**Footer**] function key.

The footer options are identical with those of the header, only the **Levelcontrol** option is not available.

The following parameters can be defined:

Values	Explanation
Appl. Name	The application name is printed.
Title 1	The defined protocol header is printed, see Definition of identifications and protocol headers (page 107).
Title 2	The defined protocol header is printed, see Definition of identifications and protocol headers (page 107).
Date/Time	The current date and time are printed.
User	The name of the current user is printed.
Balance Type	The balance type is printed. The balance type is generated by the balance and cannot be changed by the user.
SNR	The serial numbers of the balance and terminal are printed. The serial numbers of the balance and terminal are generated by the balance and cannot be changed.
Balance ID	The balance identification defined in the system settings is printed.

ID1	The identification defined via the function key is printed. Information on practical working with identifications, see Working with identifications (page 116).
ID2	The identification defined via the function key is printed. Information on practical working with identifications, see Working with identifications (page 116).
ID3	The identification defined via the function key is printed. Information on practical working with identifications, see Working with identifications (page 116).
ID4	The identification defined via the function key is printed. Information on practical working with identifications, see Working with identifications (page 116).
Nom.,+Tol,-Tol	Recorded the defined nominal weight and the defined plus and minus tolerances.
MW-Method	Records the selected method for the minimum weight. Information on minimum weight settings, see MinWeigh function settings (page 109).
Signature	Inserts a line block for signing the protocol.
Blank Line	A blank line is printed.
Dash Line	Inserts a dashed dividing line (this option is available twice).
3 Blank Lines	Prints 3 space lines at the end of the protocol (paper feed).

Factory setting: **Signature** activated.

7.1.8 Specifications for manual protocol printout

Navigation:  > [**Weighing**] >  > **Print key**

This menu item can be used to define the behavior of the  key (protocol printout).

- 1 Press .
 - ⇒ A window with application-dependent settings opens.
- 2 Tap **Print key** on the associated button.
 - ⇒ A selection window is displayed.
- 3 Change the setting.
- 4 To exit the menu item, tap [**OK**].

The following parameters can be defined:

Values	Explanation
Stable	The protocol is only printed if the weighing result is stable.
Dynamic	The protocol is printed immediately, regardless of whether the weighing result is stable.
Off	No protocol is printed, the key is inactive.

Factory setting: **Stable**.

7.1.9 Output data formatting (transfer key)

Navigation:  > [**Weighing**] >  > **Transfer Key**

A stable weight can be transferred via the interface to a host computer with the [**Transfer**] function key. This menu item can be used to define the formatting for output values. This can be necessary if the balance is operated together with other instruments, programs or peripheral devices that use a specific data format. It can be defined whether data is output to the host or also to the printer.

- 1 Press [].
⇒ A window with application-dependent settings is displayed.
- 2 Under **Transfer Key**, tap the [**Define**] button.
⇒ **Transfer Key** window is displayed.
- 3 Change the settings and confirm with [**OK**].
- 4 To exit the menu item, tap [**OK**].

Menu structure

Main menu	Submenu	Further information
Data output format	Standard	See Output format (page 105)
	Customise	
Data transfer to printer	Off	See Data output to the printer (page 106)
	On	

7.1.9.1 Output format

Data output is set by default to a standard format that generally corresponds to the weight displayed at the terminal, followed by an end-of-line character defined for the host. Negative weights are displayed with a minus sign. The output weight is left-justified.

See Peripherals (page 73).

Example (-12.8934 g):

1	2	3	4	5	6	7	8	9	10	11	12
-	1	2	.	8	9	3	4		g	C _F	L _F

Note

- If the resolution of the displayed value is reduced, the weight is also transferred with reduced resolution to the host.
- If the balance has overload or underload at the time of data transfer, **UNDERLOAD** or **OVERLOAD** is transferred instead of the weight.

- 1 The output format can be changed by tapping the associated button under **Data output format**.
- 2 Activate [**Customise**] and subsequently tap the [**Define**] button.

Menu structure

Main menu	Submenu	Further information
Net indicator field	Off	See Section Net weight icon
	Field length	
Weight field	Field length	See Section Weight format
	No. of decimal digits	
	Sign	
	Sign position	
Unit field	Off	See Section Weight unit field
	Field length	

Net weight icon

In the standard output format, net weights are not specially marked. To place an **N** in front of net weights, this function can be activated and also the field length defined. The net symbol is left-justified in the field.

The following parameters can be defined:

Parameters	Explanation	Values
Off	Net weight icon deactivated.	None *

Field length	Activates the net weight icon. Defines the field length (max. 10 characters). Note If the balance was not tared, the net symbol is not transferred. Blank characters are transferred appropriate to the selected field length.	1 ... 10 (5 characters)*
---------------------	---	-----------------------------

* Factory setting

Weight format

The following parameters can be defined:

Parameters	Explanation	Values
Field length	Defines the total length of the weight data field including sign, decimal point and decimal places (max. 20 characters). Note Irrespective of their setting, as many places are output as necessary for complete transfer of the weight displayed at the terminal. The weight is output right-justified.	1 ... 20 (10)*
No. of decimal digits	Defines the number of decimal places. If the set value has less than the number of decimal places displayed at the terminal, a rounded value with the selected number of decimal places is transferred.	0 ... 6 (max. number of places of the balance)*
Sign	Defines the sign. Always = each weight is preceded by a plus or minus sign. Neg. values = only negative values are preceded by a minus sign. Positive values are transferred without sign.	Always Neg. values*
Sign position	Defines whether the sign should directly precede the weight (right-justified) or left-justified.	-xxx.yy* - xxx.yy

* Factory setting

Weight unit field

In the standard output format, each weight is output with the weight unit (appropriate to the current display unit). This menu can be used to select whether weights are transferred with or without unit and also define the field length for the weight unit.

The following parameters can be defined:

Parameters	Explanation	Values
Off	Defines whether weights are transferred with or without unit.	None (Output of weight unit activated)*
Field length	Defines the field length (max. 5 characters). Irrespective of their setting for the field length, as many places are output as necessary for complete transfer of the weight displayed at the terminal. The weight unit is output left-justified (separated from the weight by a space).	1 ... 5 (3)*

* Factory setting

7.1.9.2 Data output to the printer

When the [**Transfer**] function key is pressed, the data is normally only transferred to the host. Data can also be sent to the printer by activating the setting.

Note

The previously described data formatting settings have no influence on data output to the printer. This is determined only by the protocol settings.

See Protocol definition (page 100).

The following parameters can be defined:

Values	Explanation
Off	Data output to the printer deactivated.
On	Activates data output to the printer.

Factory setting: [Off].

7.1.10 Definition of identifications and protocol headers

Navigation: [Menu] > [Weighing] > [Settings] > Identification

This menu item can be used to activate the 4 identifications or change their designations available under the [ID] function key. Define two headers for the weighing protocols. The entered designations appear in the respective information fields (e.g. company name, customer) and can be printed out in the weighing protocols

- 1 Press [Settings].
⇒ A window with application-dependent settings is displayed.
- 2 Under **Identification**, tap the [Define] button.
⇒ **Identification** window is displayed.
- 3 Settings can be changed by tapping the associated button.
⇒ An alphanumeric input window is displayed.
- 4 Enter the designation and confirm with [OK].
- 5 To exit the menu item, tap [OK].

The arrow buttons can be used to page forward or back to a menu page.

Menu structure

Main menu	Submenu	Further information
Title 1	T1	See Section Protocol header
Title 2	T2	
ID1 Name	ID1	See Section Identifications
ID2 Name	ID2	
ID3 Name	ID3	
ID4 Name	ID4	

Protocol header

The following parameters can be defined:

Values	Explanation
T1	Defines a designation for the protocol header (max. 20 characters).
T2	Defines a designation for the protocol header (max. 20 characters).

Factory setting: [T1] and [T2].

Identifications

Default ID designations are [ID1], [ID2], [ID3] and [ID4]. These can be replaced with specific designations (e.g. customer, order). The ID is subsequently available with the new designation under the [ID] function key.

Information on working with identifications, **see** Working with identifications (page 116).

The following parameters can be defined:

Parameters	Explanation	Values
ID1	Activates/deactivates the ID1 . Defines the designation (max 20 characters).	Off On* (ID1)*
ID2	Activates/deactivates the ID2 . Defines the designation (max 20 characters).	Off* On
ID3	Activates/deactivates the ID3 . Defines the designation (max 20 characters).	Off* On
ID4	Activates/deactivates the ID4 . Defines the designation (max 20 characters).	Off* On

* Factory setting

7.1.11 Instructions for processing barcode data

Navigation:  > **[Weighing]** >  > **Barcode**

If a barcode reader or keyboard is connected to the balance, this menu can be used to define how the data is to be processed.

► The external device is appropriately configured in the **[Peripherals]** system setting.

- 1 Press .
 - ⇒ A window with application-dependent settings opens.
- 2 Tap **Barcode** on the associated button.
 - ⇒ A selection window is displayed.
- 3 Settings can be changed by tapping the associated button.
- 4 To exit the menu item, tap **[OK]**.

The following parameters can be defined:

Values	Explanation
Off	No data is processed. This setting must be used if no external device is connected.
ID1	The received barcode data is treated as identification texts and the corresponding identification assigned. Note The defined designation is displayed instead of [ID1] .
ID2	The received barcode data is treated as identification texts and the corresponding identification assigned. Note The defined designation is displayed instead of [ID2] .
ID3	The received barcode data is treated as identification texts and the corresponding identification assigned. Note The defined designation is displayed instead of [ID3] .
ID4	The received barcode data is treated as identification texts and the corresponding identification assigned. Note The defined designation is displayed instead of [ID4] .
PreTare	The barcode data is interpreted as a value for the subtraction of tare weight, see Taring options (page 115).
Host	The data is transferred directly to a connected PC. If no PC is connected or this data cannot be received, it is ignored.

Open Input	<p>The data is written in the currently open input window (e.g. lot counter, ID or PreTare).</p> <p>The window is automatically closed after the data is processed. If no input window is open, the data is ignored.</p>
-------------------	--

Factory setting: [Open Input].

7.1.12 Instructions for processing RFID data

Navigation: [Menu] > [Weighing] > [RFID] > **RFID**

If a RFID reader is connected to the balance, this menu item can be used to define how the data is to be processed.

► The external device is appropriately configured in the [Peripherals] system setting.

- 1 Press [RFID].
 - ⇒ A window with application-dependent settings opens.
- 2 Tap **RFID** on the associated button.
 - ⇒ A selection window is displayed.
- 3 Settings can be changed by tapping the associated button.
- 4 To exit the menu item, tap [OK].

The following parameters can be defined:

Values	Explanation
Off	No data is processed. This setting must be used if no external device is connected.
Host	The data is transferred directly to a connected PC. If no PC is connected or this data cannot be received, it is ignored.
Open Input	The data is written in the currently open input window (e.g. lot counter, ID or PreTare). The window is automatically closed after the data is processed. If no input window is open, the data is ignored.

Factory setting: [Open Input].

7.1.13 MinWeigh function settings

Navigation: [Menu] > [Weighing] > [MinWeigh] > **MinWeigh**

Attention

The menu with the settings for the **MinWeigh** function is deactivated by default and not accessible. The **MinWeigh** function must be activated and programmed by a service engineer. If this function is required, but is not accessible in the menu, please contact your METTLER TOLEDO representative.

MinWeigh

The **MinWeigh** function ensures that the weighing results are within defined tolerances appropriate to the requirements of your quality assurance system.

The service engineer will determine the required minimum weights based on your QA requirements and subsequently load these values into the balance. Up to 3 tare weights can be defined with the corresponding minimum weights. The service engineer will set the weighing parameters to the values required for the maintenance of tolerances.

See Weighing parameters (page 83).

Note

After programming the balance, the service engineer will issue a certificate. This records the measurements and tolerances as well as corresponding tare and minimum weights for weighing. These settings cannot be changed by the user as long as the **MinWeigh** function is activated.

- ▶ The **MinWeigh** function is activated.
- 1 Press [].
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **MinWeigh**, tap the associated button.
 - ⇒ **MinWeigh** window is displayed.
- 3 Tap [**On**] and subsequently the [**Define**] button.
- 4 The settings can be changed by tapping the associated button or confirming with [**OK**].
- 5 To exit the menu item, tap [**OK**].

The following parameters can be defined:

Parameters	Explanation	Values
Method	Selects the method programmed by the service engineer according to your instructions. Up to 3 methods can be defined, e.g. [USP].	Any
Info	Displays information relating to the MinWeigh function (method, date of next test by the service engineer and required minimum weights based on reference tare weights defined by the service engineer). The information can be printed out by pressing the [] key.	Show

Factory setting: [**Off**].

7.1.14 Tare memory definition and activation

Navigation: [] > [**Weighing**] > [] > **Tare Store**

This menu item can be used to define up to 10 tare weights available under the [**Tare Store**] function key and change their designations. The default designations for the tare memory are [**T1**] ... [**T10**]. These can be replaced by specific names, e.g. designation of a tare container. The tare memory is subsequently available with the new designation under the function key.

Information on working with the tare memory, **see** Taring options (page 115).

Note

Deactivated tare memories [**Off**] cannot be selected under the [**Tare Store**] function key.

- 1 Press [].
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **Tare Store**, tap the [**Define**] button.
 - ⇒ **Tare Store** window is displayed.
- 3 The settings, e.g. **T1** can be changed by tapping the associated button.
- 4 Tap [**On**] and subsequently the associated button.
 - ⇒ An alphanumeric input window is displayed.
- 5 Enter the designation and confirm with [**OK**].
- 6 To exit the menu item, tap [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

Menu structure

Main menu	Submenu	Further information
T1 ... T10	Off	See Parameter table
	On	

The following parameters can be defined:

Parameters	Explanation	Values
Off	Deactivated tare memory.	None
On	Activates the tare memory. Defines a designation. Defines the weight.	Name Value

The following parameters can be defined:

Parameters	Explanation	Values
Name	Defines a designation for the tare memory (max. 20 characters). Note Although the designation can consist of up to 20 characters, it is recommended to use short designations. A maximum of 10 characters can be displayed under the [Tare Store] function key.	any
Value	Defines a weight. Note Instead of entering the value, the respective tare container can be placed on the weighing pan and the button with the balance icon subsequently pressed. The weight is directly taken over.	any

Factory setting: [**Off**].

7.1.15 Automatic taring function settings

Navigation:  > [**Weighing**] >  > **AutoTare**

This menu item can be used to define whether and under which conditions the balance automatically interprets the first applied weight after zeroing as the tare weight. If the **AutoTare** function is activated, [**On**], the weight criterion for the automatic taring function can be defined via the button.

Information on working with the automatic taring function, **see** Taring options (page 115).

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **AutoTare**, tap the associated button.
 - ⇒ **AutoTare** window is displayed.
- 3 Tap [**On**] and subsequently the associated button.
 - ⇒ A numeric input window is displayed.
- 4 Enter the value and confirm with [**OK**].
- 5 To exit the menu item, tap [**OK**].

The following parameters can be defined:

Parameters	Explanation	Values
Off	Deactivated AutoTare function.	None
On	Activates the automatic taring function.	Limit

The following parameters can be defined:

Parameters	Explanation	Values
Limit	This value defines the minimum weight that must be applied to the weighing pan so that it is automatically stored as the tare weight. If the weight is below the limits, it is not automatically transferred to the tare memory. Note Instead of entering the weight, the lightest tare container can be placed on the weighing pan and the button with the balance icon subsequently pressed. The applied weight is directly taken over as a limit.	Any

Factory setting: [Off].

7.1.16 Settings for SmartSens and ErgoSens

Navigation:  > [Weighing] >  > Smart & ErgoSens

This menu can be used to activate or deactivate both hands-free sensors (SmartSens) in the left and right top corner of the terminal.

External sensors connected to the connections "Aux 1" and "Aux 2" at the rear of the balance can be configured with the ErgoSens settings. ErgoSens is an optionally available external sensor. A maximum of 2 external ErgoSens can be connected to the balance.

Each of the two SmartSens and ErgoSens can be assigned one of the following functions by tapping the associated button.

Note

If one of the functions that emulate a button at the terminal is activated, the respective symbol (, ->0<- , ->T<- or ) in the status bar below the respective sensor lights up. For all other settings that emulate function keys with the same name, the green **F** (Function) symbol lights up. No symbol lights up when the sensor is deactivated.

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **Smart & ErgoSens**, tap the [Define] button.
 - ⇒ A selection window is displayed.
- 3 Select the required menu item, e.g. **SmartSens left**.
 - ⇒ A selection window is displayed.
- 4 Select the function by tapping the button.
- 5 To exit the menu item, tap [OK].

Menu structure

Main menu	Submenu	Further information
SmartSens left	Off Door ->0<- ->T<- Print ID1 ID2 ID3 ID4 Header Footer PreTare 1/2d 1/5d 1/10d 1/100d 1/1000d Transfer	See Parameter table
SmartSens right	Off Door ->0<- ->T<- Print ID1 ID2 ID3 ID4 Header Footer PreTare 1/2d 1/5d 1/10d 1/100d 1/1000d Transfer	See Parameter table
ErgoSens 1 (Aux1)	Off Door ->0<- ->T<- Print ID1 ID2 ID3 ID4 Header Footer PreTare 1/2d 1/5d 1/10d 1/100d 1/1000d Transfer Anti-Static Kit	See Parameter table
ErgoSens 2 (Aux2)	Off Door ->0<- ->T<- Print ID1 ID2 ID3 ID4 Header Footer PreTare 1/2d 1/5d 1/10d 1/100d 1/1000d Transfer Anti-Static Kit	See Parameter table

The following parameters can be defined:

Values	Explanation
Off	Sensor deactivated.
Door	Opens/closes the glass draft shield (doors).
->0<-	Zeros the balance.

->T<-	Tares the balance.
Print	Starts printing.
ID1 ... ID4	Opens the input window for the respective identification.
Header	Prints the header.
Footer	Prints the footer.
PreTare	Opens the input window for numerical entry of a fixed tare weight (subtraction of tare weight).
1/2d ... 1/1000d	Switches the weighing result resolution.
Transfer	Transfers the stable, formatted weight via the interface.
AntiStatic Kit	Activates the ionizer. To activate the ionizer, it must be selected appropriate to the connection used.

Factory setting: SmartSens left and right configured for door operation (draft shield). Both ErgoSens deactivated, [**Off**].

7.1.17 Settings for the optional anti-static kit (ionizer)

Navigation:  > [**Weighing**] >  > **AntiStatic Kit**

The optional anti-static kit eliminates the build-up of electrostatic charges on weighing objects by ionization. The ionizer must be connected to one of the two connections "Aux 1" or "Aux 2" at the rear of the balance.

► Ionizer is activated under the used connection **ErgoSens 1 (Aux1)** or **ErgoSens 2 (Aux2)**.

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **AntiStatic Kit**, tap the associated button.
 - ⇒ A selection window is displayed.
- 3 Select the function by tapping the button.
- 4 To exit the menu item, tap [**OK**].

The following parameters can be defined:

Parameters	Explanation	Values
After door opened	Defines the ionizing status. Inactive = no ionizing. Active = after opening the draft shield, ionizing takes place continuously until the draft shield (doors) is closed again (maximum 10 minutes).	Inactive Active*
After door closed	Defines the ionizing time (in seconds). Note If the time is set to "0" seconds, no ionizing takes place after closing the draft shield (doors).	0 ... 1000 (5)*

* Factory setting

7.1.18 Settings for electrostatic detection

Navigation:  > [**Weighing**] >  > **ES-Detection**

Electrostatic charges on weighing containers or samples can lead to incorrect measurement. The electrostatic detection is used to measure electrostatic charges and quantify their influence on the weighing result. If a result exceeds a user-defined threshold value, an appropriate warning is generated.

The visual display in the weighing chamber shows blue during measurement. If a relevant charge is detected, the visual display flashes as an additional warning next to the warning message on the terminal.

The sample can be discharged by holding and turning it in front of the ionizer for several seconds. Turning the sample neutralizes enveloping charges.

► Ionizer is activated under the used connection **ErgoSens 1 (Aux1)** or **ErgoSens 2 (Aux2)**.

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **ES-Detection**, tap the associated button.
 - ⇒ A selection window is displayed.
- 3 Select the function by tapping the button.
- 4 To exit the menu item, tap **[OK]**.

The following parameters can be defined:

Parameters	Explanation	Values
Detection mode	Defines the electrostatic detection mode. Automatic = after motorized closure of the doors (manual closure cannot be detected by the balance) Manual = after pressing the [ES-Det.] function key Note Both the detection mode and door function must NOT be set to Automatic . If both options are set to Automatic , the electrostatic detection has priority, i.e. the doors are not automatically operated.	Automatic* Manual
Air temp.	Defines the threshold value for a warning message. Number that indicates from which incorrect weight a warning message is generated.	Number in [g]

* Factory setting

7.2 Working with the weighing application

Navigation:  > **[Weighing]**

This section describes the use of various functions of the **Weighing** application in practice.

7.2.1 Changing the weighing result resolution

The balance is set by default so that the weighing result is displayed with the maximum resolution, depending on the particular model (corresponding to 1d). The weighing result resolution can be changed at any time.

Note

These function keys are inactive when the **MinWeigh** function is active or a free weighing unit is used.

- Function keys are activated.
- Tap the respective function key.
 - ⇒ When the respective function key is tapped again, the balance displays the result with normal resolution again.



1/2d

Displays the last decimal place in increments of 2.

1/5d

Displays the last decimal place in increments of 5.

1/10d

Displays the result in a 10x lower resolution.

1/100d

Displays the result in a 100x lower resolution.

1/1000d

Displays the result in a 1000x lower resolution.

7.2.2 Taring options

The tare weight is normally determined by placing the weighing container on the balance and subsequently pressing the [→T←] key. The balance offers further taring options, which facilitate daily working procedures.

Manual entry of the tare weight (subtraction of tare weight or PreTare)

If the same weighing container is used over an extended period, the weight can be entered manually. This saves taring when placing the weighing container on the balance. The tare weight is displayed as a negative value when the weighing container is removed. When the container is placed on the balance again, the display shows zero and the balance is immediately ready to use.



PreTare

► Function key is activated.

1 Tap [**PreTare**].

⇒ A numeric input window is displayed.

2 Enter the required tare weight.

Check the weighing unit, which is displayed to the right of the tare weight (free weighing units are not available for manual entry of the tare weight).

A selection of available units can be displayed by tapping the weighing unit.

Note

Instead of entering the weight, place the tare container on the weighing pan and subsequently tap the button with the balance symbol. Wait until the displayed weight is stable before taking over with [**OK**]!

3 Confirm with [**OK**] to activate subtraction of the tare weight.

⇒ The value for subtraction of the tare weight remains stored until a new value is entered, the [→0←] or [→T←] key is pressed or the balance is switched off.

Using the automatic taring function

The balance can be configured to always automatically interpret the first applied weight as the tare weight.

► **AutoTare** function is activated.

1 Press [→0←] (otherwise the automatic acceptance of the tare weight will not function).

2 Place an empty container on the weighing pan.

⇒ When the weight is stable, this is taken over as the tare weight.

⇒ The weight display is set to zero and **Net** symbol is displayed.

3 Start weighing.

⇒ When the full container is removed, the **Net** symbol extinguishes and the stored tare weight is deleted.

Working with the tare memories

If different tare containers are used, their weights can be stored and displayed by pressing a button at any time whilst weighing. Up to 10 tare memories can be defined.

Note

The memory designations correspond to those defined in the menu, e.g. [**Tare1**].



Tare Store

- ▶ Function key is activated.
- ▶ Tare memories are defined and activated.
- 1 Tap [**Tare Store**].
 - ⇒ A selection window is displayed.
- 2 Tap the required memory.
 - ⇒ The associated tare weight is loaded.
- ⇒ The tare weight remains active until a new tare memory is selected, the [**→0←**] or [**→T←**] button is pressed, the application is changed, a different user profile is selected or the balance is switched off.

7.2.3 Working with the lot counter

The lot counter places a number in front of each weight during protocol printing, which is automatically incremented by 1 with each printout.

Note

When working with the lot counter, it is recommended to also activate the associated information field. This allows the current lot counter reading to be displayed at any time.

See Selecting information fields (page 97).

Each time a printout is started with the  button, the weights are preceded by a lot counter, which is incremented by 1 with each new printout. When the lot counter reaches the maximum value of 999, the numbering starts at 1 again.

Note

The lot counter also functions with automatic protocol printout.

See Specifications for automatic protocol printout (page 98).

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

Example: Printout

1	N	135.87 g
2	N	184.24 g
3	N	117.96 g



Lot counter

- ▶ Function key is activated.
- 1 Tap [**Lot counter**].
 - ⇒ A numeric input window is displayed.
- 2 Enter the start value for the lot counter (1 ... 999).
The value 0 is preset by default, i.e. the lot counter is deactivated.
- 3 Confirm with [**OK**] to activate the lot counter.

7.2.4 Working with identifications

Identifications are descriptive texts for individual weighing processes that allow perfect assignment of weighing objects to specific customer orders. The identifications are also printed on the protocols (or transferred to a connected computer).

The 4 identifications are designated by default with **[ID1]**, **[ID2]**, **[ID3]** and **[ID4]**. These designations can be replaced with other titles to suit the particular application (max. 20 characters). The selected designations (e.g. **customer** for the **[ID1]**, **order** for the **[ID2]**, **lot** for the **[ID3]** and **batch** for the **[ID4]**) are subsequently available under the **[ID]** function key.

Note

If the IDs are deactivated, the function key is grayed and cannot be actuated. In this case, the IDs must first be activated before they can be used.

See Definition of identifications and protocol headers (page 107).

When working with identifications, it is recommended to also activate the respective information fields. The information fields show the designations entered for the identifications.

See Selecting information fields (page 97).

If the weighing protocol is defined in such a way that the identifications are also printed, the defined ID designations, e.g. **[Customer]** and the entered text, e.g. **METTLER TOLEDO** are printed out.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

Example: Printout

```

----- Weighing -----
25.Jul 2013          17:21
Client
                METTLER TOLEDO
Order            MT-18/2004
Lot              18/2B
Sample          1/4
   N            242.83 g
   T             20.76 g
   G            263.59 g
  
```



ID

- ▶ Function key is activated.
 - 1 Tap **[ID]**.
 - ⇒ A selection window with the available identifications is displayed.
 - 2 Tap the associated button to be processed, e.g. **[Customer]**.
 - ⇒ An alphanumeric input window is displayed.
 - 3 Enter the designation, e.g. **METTLER TOLEDO** and confirm with **[OK]**.
 - ⇒ When all entries have been made, the selected identifications can be rechecked against the information fields in the display.
 - ⇒ All identification texts remain stored until they are replaced with new ones.

7.2.5 Weighing-in to a nominal weight

The **[Weighing]** application offers additional functions that facilitate weighing-in to a defined nominal weight.

Initial settings

To enter the nominal weight and the associated tolerance range, enable the function keys listed below. Also enable the data fields with the same names so that the defined values will be displayed.



Nominal – Enable function keys.



+Tolerance



-Tolerance

Procedure

► Function keys are activated.

1 Tap [**Nominal**].

⇒ A numeric input window is displayed.

2 Enter the required value.

- If a weight corresponding to the nominal weight is already on the balance, it can be directly taken over by tapping the button with the balance icon.

Check the weighing unit to the right of the nominal weight.

A selection of available units can be displayed by tapping the weighing unit.

Note

Units are not converted automatically. When a value is entered in a unit, it is retained, even when the unit is changed.

3 Confirm with [**OK**] to activate the nominal weight.

4 Tap [**+Tolerance**] and/or [**-Tolerance**]

⇒ A numeric input window is displayed.

5 Enter the required value.

Both tolerances are set to 2.5% by default. Instead of a percentage, an absolute tolerance can be entered in any unit, e.g. [**g**].

6 Confirm with [**OK**] to activate the tolerance.

⇒ The **SmartTrac** graphic weighing-in aid with tolerance marks to facilitate weighing-in to the nominal weight is displayed.

⇒ Samples can be roughly weighed until the lower tolerance limit is reached and subsequent additions made up to the nominal weight.

7.2.6 Working with the "MinWeigh" function

The **MinWeigh** function ensures that the weighing results are within defined tolerances appropriate to the requirements of your quality assurance system. This function must be activated and programmed by a service engineer.

It is also recommended to activate the three information fields **MinWeigh**, **RefTare** and **Tare**.

Note

If several reference tare weights (and the associated minimum weights) were programmed by the service engineer, the required minimum weight automatically changes appropriate to the applied tare weight.

The weighing result can be printed with the [] key. The example printout shows part of a sample protocol containing specifications for the **MinWeigh** function (method, reference tare weight and required minimum weight) as well as the current weights. The asterisk to the left of the net weight indicates that the minimum weight in the example was not reached and the value does not satisfy the quality assurance requirements.

► A printer is connected and activated as an output device in the peripheral device settings.

– To print out the settings, press [].

Example: Printout

MW-Method		USP
Ref. Tare	120.00	g
MinWeigh	20.00	g
*N	17.03	g
T	46.85	g
G	63.88	g



► **MinWeigh** function is activated.

- 1 Activate the **MinWeigh**, **RefTare** and **Tare** information fields.
 - ⇒ The values and references are displayed in the information field.
 - ⇒ In the display to the left of the weighing result is a small weight icon with the character "<".
- 2 Press [**→0←**].
 - ⇒ Sets the display to zero.
- 3 Place the tare weight (weighing container) on the weighing pan and press [**→T←**] to tare the balance.
 - ⇒ The balance determines the tare weight and displays it in the **Tare** information field.
 - ⇒ The **Net** symbol (net weight) is displayed next to the weight display.
- 4 Place the weighing object on the balance, e.g. 20 g.
 - ⇒ During the weighing operation, the weight is initially displayed in a light color to indicate that the minimum weight has not yet been reached.
 - ⇒ When the required minimum weight is reached, the weight is displayed in dark digits and the small weight icon extinguishes.



Note

If the status icon (small weight icon with clock) appears at the top right of the display (below the date and time), the next test for the **MinWeigh** function is due. Contact the relevant customer service department. A service engineer will perform the **MinWeigh** test as quickly as possible.

Example

When working according to GMP, the permissible tolerance is 1%, 2 s. When working according to USP, this is 0.1 %, 2 s.

7.3 Balance adjustment and testing

Navigation:  > [**Weighing**]

Like any precision instrument, the balance must be adjusted at regular intervals. The balance offers extensive options for adjustment and testing.

Deviations must be able to be identified at an early stage and process tolerances checked. The risk can be minimized by regular testing.

The adjustment is intended for adjusting the sensitivity of the balance. For this purpose, at least one reference weight is placed on the weighing pan either manually or motorized. This is weighed and the indicated weight is stored. The sensitivity of the balance is subsequently corrected by the required amount.

The test is intended for testing the sensitivity of the balance.

See Settings for adjustments and tests (page 43).

The balance is set to full automatic adjustment with ProFACT at the factory. ProFACT adjusts the balance fully automatically based on predefined criteria. Manual adjustments and/or tests can be carried out as required with the internal or an external weight.

If a printer is connected to the balance, the adjustments can be printed out according to user-specific settings.

See Protocol – Definition of adjustment and test reports (page 71).

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

The following descriptions assume that the **[Adjust.int]**, **[Adjust.ext]**, **[Test int]** and **[Test ext]** function keys are activated for adjustment and tests.

7.3.1 Adjustment

7.3.1.1 Adjustment with internal weight/ProFACT

ProFACT adjusts the balance fully automatically based on predefined criteria.

Note

ProFACT is activated several times in the first 24 hours after connection to the power supply, irrespective of the selected criteria.



After meeting a predefined time and/or temperature criterion, the small ProFACT status icon appears at the top right of the display (below the date and time). The balance thus indicates the need to make a ProFACT adjustment.

- 1 Unload the balance.
- 2 Do not select any key for 2 minutes.
 - ⇒ Adjustment starts automatically.

During the adjustment, a window with information on the current adjustment is displayed. If the balance is in use at the time of adjustment, adjustment can be ended with the **[Cancel]** button. Adjustment is restarted by the balance at the next opportunity.

When adjustment is complete, the balance automatically returns to the application. The small weight icon at the top right of the display extinguishes. Each adjustment is automatically recorded based on the selections made in the system settings for recording adjustments

The described procedure is based on the factory setting. The procedure for internal adjustment can be extended with internal tests with **Advanced Options**.

See Extended options (page 67).

Manual adjustment activation



Adjust.int

Adjustment of the balance with the built-in weight can be initiated by tapping this function key. This can take place as required.

- ▶ **[Adjust.int]** function key is activated.
- 1 Tap **[Adjust.int]**.
 - ⇒ An information window opens.
 - ⇒ The motorized lowering and lifting motion of the internal weight is audible.
 - 2 If **Adjustment done** is displayed, confirm with **[OK]**.
 - 3 If **Adjustment abort** is displayed:
 - If adjustment is aborted, confirm with **[OK]**.
 - If adjustment is aborted by the balance, tap **[Retry]**.

7.3.1.2 Adjustment with external test weight

Note

Depending on the country-specific requirements, adjustment with an external weight for calibration balances may not be available.



When a specific day or time is reached, the small adjustment icon appears at the top right of the display (below the date and time). This is an indication that the balance requires adjustment.

The balance then requests adjustment at the defined time. The last selected test weight is always used for automatic external adjustment.

► **Autom. ext. Adjust.** is activated.

► **Test/Adj. Weight** are defined.

1 Tap [**Yes**] to start the adjustment sequence described below.

2 When is [**Later**] tapped, a request for adjustment is repeated after 15 minutes.

Note

The small weight icon (status icon) for automatic external adjustment at the top right of the display, extinguishes after successful adjustment or if adjustment is declined at the second request [**No**]. The balance automatically returns to the application. Each adjustment is automatically recorded based on the selections made in the system settings for recording adjustments

Manual adjustment activation



Adjust.ext

Adjustment of the balance with an external test weight can be initiated by tapping this function key. This can take place as required.

Adjustment sequence

► [**Adjust.ext**] function key is activated.

► **Test/Adj. Weight** are defined.

1 Tap [**Adjust.ext**].

⇒ A list is displayed for selection of the test weight.

2 Select a test weight by tapping.

⇒ Adjustment starts.

3 Use the correct test weight. The ID and certificate number of the respective test weight are displayed if available.

Note

Ensure that the correct test weight is used, otherwise the adjustment will be aborted with an error message.

⇒ The required weight flashes at the bottom of the window and adjustment takes place automatically.

4 Remove the test weight from the weighing pan when adjustment is complete.

⇒ When the process is complete, one of the following messages is displayed.

5 If **Adjustment done** is displayed, confirm with [**OK**].

6 If **Adjustment abort** is displayed:

- If adjustment is aborted, confirm with [**OK**].

- If adjustment is aborted by the balance, tap [**Retry**].

7.3.2 Testing

7.3.2.1 Testing the adjustment with internal weight

The test is intended for testing the sensitivity of the balance.



Test int

The balance can be tested for correct adjustment using the internal weight by tapping this function key. This can be carried out as required.

► [**Test int**] function key is activated.

1 Tap [**Test int**].

⇒ An information window opens.

- ⇒ The motorized lowering and lifting motion of the internal weight is audible.
 - ⇒ When the process is complete, one of the following messages is displayed.
- 2 If **Test done** is displayed, confirm with [**OK**].
 - 3 If **Test Aborted!** is displayed:
 - If the test is aborted by the user, confirm with [**OK**].
 - If the test aborted by the balance, tap [**Retry**].

7.3.2.2 Testing the adjustment with external test weight



When a specific day or time is reached, the small test icon appears at the top right of the display (below the date and time). This is an indication that the balance requires testing.

For the automatic external test, the last selected test weight is always used.

- ▶ **Autom. ext. Test** is activated.
- ▶ **Test/Adj. Weight** are defined.

- 1 Tap [**Yes**] to start the test sequence described below.
- 2 When [**Later**] is tapped, a request for testing the adjustment is repeated after 15 minutes.

Note

The small weight icon (status icon) for automatic external adjustment at the top right of the display, extinguishes after successful testing or if the test is declined at the second request [**No**].

Manual test activation



Test ext

The balance can be tested for correct adjustment with an external test weight by tapping this function key. This can be carried out as required.

- ▶ [**Test ext**] function key is activated.
 - ▶ **Test/Adj. Weight** are defined.
- 1 Tap [**Test ext**].
 - ⇒ A list is displayed for selection of the test weight.
 - 2 Select a test weight by tapping.
 - ⇒ The test starts.
 - 3 Use the correct test weight. The ID and certificate number of the respective test weight are displayed if available.

Note

Ensure that the correct test weight is used, otherwise the test sequence will be aborted with an error message.

 - ⇒ The required weight flashes at the bottom of the window and the test sequence takes place automatically.
 - 4 Remove the test weight from the weighing pan when the test is complete.
 - ⇒ When the test is complete, one of the following messages is displayed.
 - 5 If **Adjustment done** is displayed, confirm with [**OK**].
 - 6 If **Adjustment abort** is displayed:
 - If the test is aborted by the user, confirm with [**OK**].
 - If the test aborted by the balance, tap [**Retry**].

7.3.3 Protocols

The detail of the record depends on the selected settings.

See Protocol – Definition of adjustment and test reports (page 71).

- ▶ **[Adj. History]** function key is activated.
- 1 Adjustments and tests can be displayed by tapping **[Adj. History]**.
 - ⇒ An information window opens.
- 2 Press  to print.
- 3 To exit the menu item, tap **[OK]**.

7.3.3.1 Adjustment and test records (sample records)

Example: Printout

Internal or ProFACT adjustment protocol

```

- Internal adjustment --
25.Jul 2013           16:02

METTLER TOLEDO
User Name             User 1

Balance Type          XPE204
WeighBridge SNR:
                      1234567890
Terminal SNR: 1234567891
Balance ID            Lab A/1

Temperature           21.2 °C

Balance is levelled

Adjustment done

Signature

.....
-----

```

External adjustment protocol

```

- External adjustment --
25.Jul 2013           16:12

METTLER TOLEDO
User Name             User 1

Balance Type          XPE204
WeighBridge SNR:
                      1234567890
Terminal SNR: 1234567891
Balance ID            Lab A/1
Weight ID             ECW-6000/1
Certificate No. MT-414/A
Temperature           20.8 °C
Nominal               200.00 g

Balance is levelled

Adjustment done

Signature

.....
-----

```

Note

No signature line is printed for a ProFACT adjustment.

Internal test protocol

```
---- Internal test ----
25.Jul 2013      16:22

METTLER TOLEDO
User Name      User 1

Balance Type    XPE204
WeighBridge SNR:
                1234567890
Terminal SNR: 1234567891
Balance ID      Lab A/1
Temperature     19.8 °C
Nominal         100.0000 %
Actual          99.9981 %
Diff            -0.0019 %

Balance is levelled

Test done

Signature
.....
-----
```

External test protocol

```
---- External test ----
25.Jul 2013      16:32

METTLER TOLEDO
User Name      User 1

Balance Type    XPE204
WeighBridge SNR:
                1234567890
Terminal SNR: 1234567891
Balance ID      Lab A/1
Weight ID       ETW-200/1
Certificate No. MT-806/5
Temperature     20.2 °C
Nominal         200.00 g
Actual          199.90 g
Diff            -0.10 g

Balance is levelled

Test done

Signature
.....
-----
```

7.4 Working with the test sequence function

Navigation:  > [Weighing]

Define test sequences, test (method) and weight to be used. The user is guided through the test with the display of clear instructions. The test should be carried out according to GWP® or other QM systems.

All parameters and values for the test sequence have been defined and the test sequence assigned to a task. Define tasks - when and how the test sequence will be carried out. If standard is selected under the [**Preparation Instructions**] menu item, preparatory instructions are displayed in the test sequence. These correspond to the typical SOP standard. These instructions must be followed and confirmed with [**OK**] before the rest of the test sequence can be continued.

Note

The extensiveness of the test depends on the settings selected (e.g. **Preparation Instructions, Action if Failure, AutoZero**).

See Test sequences (page 45) and Configuration of test sequence parameters (page 46).

On completion of the test, the measurements are printed together with the results.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

A method describes the type of test to be carried out and defines the main purpose of a test sequence. There are 8 different methods available.

7.4.1 Starting a task

A task can be started either automatically or manually depending on the particular settings.

GWP When a specific day or time is reached, the small GWP icon appears at the top right of the display (below the date and time). This is an indication that the balance requires a task to be performed. An instruction window is simultaneously displayed, which guides the user through the test. These instructions must be followed.

- ▶ Test sequence is defined and assigned to a task.
 - 1 Follow the instructions and confirm with [**OK**].
 - 2 Remove all weights and confirm with [**OK**].
 - 3 Level the balance and confirm with [**OK**].
 - 4 Follow further instructions depending on the selected task.

Note

The instruction window is closed and the small GWP icon for the task at the top right of the display extinguishes on successful completion of the test.

Manual test activation



Test Sequence

A test sequence can be started manually by tapping the function key.

- ▶ [**Test Sequence**] function key is activated.
- ▶ Test sequence is defined and assigned to a task.
 - 1 Tap [**Test Sequence**].
 - ⇒ A selection window with test sequences is displayed.
 - 2 Tap the test sequence.
 - ⇒ An instruction window is displayed.

The test sequence was started
Follow the instructions below:

 1. Clean the weighing pan.
 2. Level the balance.
 3. Switch on the printer if necessary.
 4. Have the test weights ready.
 5. Have the weight tweezers/fork ready.

When all instructions have been followed, confirm with [**OK**] and follow further test sequence instructions.
 - 3 Remove all weights and confirm with [**OK**].
 - 4 Level the balance and confirm with [**OK**].

7.4.1.1 EC Method for eccentric load test

The purpose of the **EC** method (eccentric load test) is to ensure that every eccentric load deviation is within the necessary user SOP tolerances.

- The result corresponds to the highest of the 4 determined eccentric load deviations.

Method

The procedure is as follows:

- 1 Zero the balance.
- 2 Place the test weight in the center and confirm with [**OK**].
- 3 Place the test weight at the front left and confirm with [**OK**].
- 4 Place the test weight at the rear left and confirm with [**OK**].
- 5 Place the test weight at the rear right and confirm with [**OK**].

- 6 Place the test weight at the front right and confirm with [OK].
- 7 Remove all weights and confirm with [OK].
- 8 Zero the balance.
 - ⇒ The test results are displayed together with the results.
- 9 To exit the menu item, tap [OK].
- 10 To abort, tap [C].
 - ⇒ The test is printed out.

7.4.1.2 RP1 Method for repeatability test

The **RP1** method calculates the mean and standard deviation (Symbol s) of a series of measurements with a single test weight in order to determine the repeatability of the balance.

Method

The procedure is as follows:

- 1 Zero the balance.
- 2 Place the test weight on the balance and confirm with [OK].
- 3 Remove the test weight and confirm with [OK].
- 4 Repeat steps 2 and 3.
- 5 Zero the balance.
 - ⇒ The test results are displayed together with the results.
- 6 To exit the menu item, tap [OK].
- 7 To abort, tap [C].
 - ⇒ The test is printed out.

7.4.1.3 RPT1 Method for repeatability test with tare weight

The **RPT1** method calculates the mean and standard deviation (Symbol s) of a series of measurements with two test weights in order to determine the repeatability. In contrast to the **RP1** method, a second test weight is used to simulate the use of a tare container.

Method

The procedure is as follows:

- 1 Zero the balance.
- 2 Place the tare weight on the balance and confirm with [OK].
- 3 Tare the balance.
- 4 Place the test weight on the balance and confirm with [OK].
- 5 Remove the test weight and confirm with [OK].
- 6 Repeat steps 4 and 5.
- 7 Zero the balance.
 - ⇒ The test results are displayed together with the results.
- 8 To exit the menu item, tap [OK].
- 9 To abort, tap [C].
 - ⇒ The test is printed out.

7.4.1.4 SE1 Method for sensitivity test with one test weight

The **SE1** method tests the sensitivity of the balance with one test weight.

Method

The procedure is as follows:

- 1 Zero the balance.
- 2 Place the test weight on the balance and confirm with [**OK**].
- 3 Remove the test weight and confirm with [**OK**].
- 4 Zero the balance.
 - ⇒ The test results are displayed together with the results.
- 5 To exit the menu item, tap [**OK**].
- 6 To abort, tap [**C**].
 - ⇒ The test is printed out.

7.4.1.5 SE2 Method for sensitivity test with two test weights

The **SE2** method tests the sensitivity of the balance with two test weights.

Method

The procedure is as follows:

- 1 Zero the balance.
- 2 Place test weight 1 on the balance and confirm with [**OK**].
- 3 Remove test weight 1 and confirm with [**OK**].
- 4 Zero the balance.
- 5 Place test weight 2 on the balance and confirm with [**OK**].
- 6 Remove test weight 2 and confirm with [**OK**].
- 7 Zero the balance.
 - ⇒ The test results are displayed together with the results.
- 8 To exit the menu item, tap [**OK**].
- 9 To abort, tap [**C**].
 - ⇒ The test is printed out.

7.4.1.6 SERVICE method reminder/pre-warning time

The **SERVICE** method is a special method that requires no test weight. It is normally set to perform regular checks of various data (dates) in the background. It usually ends automatically without any user action and displayed messages. It is normally used as a reminder for the next service date or MinWeigh date. The date is checked on a regular basis and a message is only displayed when the defined task is due. The **SERVICE** method can also be used to draw early attention to a due test appropriate to the pre-warning time.

- ▶ [**Test Sequence**] function key is activated.
- ▶ Test sequence is defined and assigned to a task.
- Carry out the task.

7.4.1.7 SET1 Method for sensitivity test with tare weight and one test weight

The **SET1** method tests the sensitivity of the balance with two test weights. The first test weight is used to simulate a tare container.

Method

The procedure is as follows:

- 1 Zero the balance.
- 2 Place the tare weight on the balance and confirm with [**OK**].
- 3 Tare the balance.
- 4 Place the test weight on the balance and confirm with [**OK**].
- 5 Remove the test weight and confirm with [**OK**].
- 6 Zero the balance.
⇒ The test results are displayed together with the results.
- 7 To exit the menu item, tap [**OK**].
- 8 To abort, tap [**C**].
⇒ The test is printed out.

7.4.1.8 SET2 Method for sensitivity test with tare weight and two test weights

The **SET2** method tests the sensitivity of the balance with three test weights. The second test weight (tare weight) is used to simulate a tare container.

Method

The procedure is as follows:

- 1 Zero the balance.
- 2 Place test weight 1 on the balance and confirm with [**OK**].
- 3 Remove test weight 1 and confirm with [**OK**].
- 4 Zero the balance.
- 5 Place the tare weight on the balance and confirm with [**OK**].
- 6 Tare the balance.
- 7 Place test weight 2 on the balance and confirm with [**OK**].
- 8 Remove all weights and confirm with [**OK**].
- 9 Zero the balance.
⇒ The test results are displayed together with the results.
- 10 To exit the menu item, tap [**OK**].
- 11 To abort, tap [**C**].
⇒ The test is printed out.

8 Statistics Application

Navigation:  > [Statistics]



This section provides information and descriptions of setting options for practical use of the application.

The application allows you to generate and evaluate statistics for a series of weighings. It can handle 1 to 999 values.

All application settings are saved under the active user profile. Each user can select specific settings for this application. It must be ensured that the required user profile is selected.

The **Statistics** application has the same basic features as the **Weighing** application. However, it includes additional settings and functions for statistical data acquisition and evaluation of a series of weighings.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

Note

If you use statistics together with the LV11, please observe the information in the "**Solution Guide**", which can be obtained online at <http://www.mt.com>.

Selecting the application

- 1 Press .
 - 2 Tap the [Statistics] icon in the selection window.
 - ⇒ The selected application is active.
 - ⇒ Some of the specific function keys and data fields for statistics are enabled by default (factory defaults).
 - ⇒ The two function keys [Result] and [CL Result] are disabled and are therefore shown differently because there is no statistical data available at this point in time.
- ⇒ The balance is ready for weighing.

8.1 Settings for the Statistics application

Navigation:  > [Statistics] > 

Several specific settings are available for statistics. You can use them to adapt the application to your needs.

Most of the setting options are the same as for the **Weighing** application. Only the settings that differ are described below.

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Menu item	Explanation	Further information
Function Keys	Define which function keys for statistics are shown at the bottom of the display. These keys enable direct access to specific functions.	See Specific function keys for using statistics (page 130)
Info Field	Define which data fields for statistics are displayed.	see Specific data fields for statistics (page 130)
Autom. Weight-Entry	Activates/deactivates automatic weight entry.	see Specifications for automatic weight entry (page 131)
Protocol	Select data to be shown on the weighing protocol.	See Specific protocol information for statistics (page 132)
Additive Weighing	Activates/deactivates the additive mode (series weighing with automatic taring).	see Enable additive mode (page 134)
Plausibility-Check	Define the limit values for plausible weighing results.	See Define plausibility limits (page 134)

Tablet Feeder	Define the specifications for cooperation between the statistics function and the LV1 1 tablet feeder.	See Settings for the LV1 1 tablet feeder (page 135)
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8.1.1 Specific function keys for using statistics

Navigation:  > [Statistics] >  > **Function Keys**

This menu item allows you to enable the specific function keys listed below for using statistics.

All other function keys are the same as for the **Weighing** application.

The numbered function keys are displayed in the application at the bottom of the display. The numbers define the sequence in the display.

- Activate or deactivate function keys by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.

► Application is activated.

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **Function Keys**, tap the [Define] button.
- 3 Select a function key by tapping.
 - ⇒ The function key is automatically numbered.
- 4 Change the settings and confirm with [OK].
- 5 To restore the factory default settings, tap [STD].
- 6 To exit the menu item, tap [OK].

The arrow buttons can be used to page forward or back to a menu page.

	Designation	Explanation
	M+	Enters the current value.
	Result	Opens the results window.
	CL Result	Clears the results memory.
	CL Last	Deletes the last saved value.
	Nominal	Defines the desired nominal weight. This also serves as a reference for the tolerances.
	+Tol	Defines the accuracy (tolerance range) for weighing to a nominal weight.
	-Tol	Defines the accuracy (tolerance range) for weighing to a nominal weight.
	Max n	Defines the maximum number of weighings in a series.

Factory setting: [M+], [Result] and [CL Result] are enabled in this order.

8.1.2 Specific data fields for statistics

Navigation:  > [Statistics] >  > **Info Field**

This menu item provides the data fields listed below for displaying statistical values.

All other data fields are the same as for the **Weighing** application.

The information fields in the display provide constant information on, e.g. set values, measured results.

- Information fields can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all information fields must be deactivated and then activated in the required sequence.

► Application is activated.

- 1 Press [].
⇒ A window with application-dependent settings is displayed.
- 2 Under **Info Field**, tap the [**Define**] button.
- 3 Select **Info Field** by tapping.
⇒ The information field is automatically numbered.
- 4 Change the settings and confirm with [**OK**].
- 5 To restore the factory default settings, tap [**STD**].
- 6 To exit the menu item, tap [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Values	Explanation
n	Shows the number of weighings that have been made.
x	Shows the average weight of all weighings.
s	Shows the standard deviation as an absolute value.
s.rel	Shows the standard deviation as a percentage.
Sum	Shows the total weight of all individual weighings.
>T+	Shows the number of weighings outside the upper weight tolerance.
<T-	Shows the number of weighings outside the lower weight tolerance.
Min	Shows the lowest measured weight of the current series.
Max	Shows the highest measured weight of the current series.
Diff.	Shows the difference between the lowest and the highest weights.
Nominal	This function key displays the nominal weight.
+Tol	This function key displays the entered tolerance for weighing-in to nominal weight.
-Tol	This function key displays the entered tolerance for weighing-in to nominal weight.

Factory setting: **n**, **x** and **s** are enabled in this order.

8.1.3 Specifications for automatic weight entry

Navigation: [] > [**Statistics**] > [] > **Autom. WeightEntry**

Here you define whether and under which conditions the balance should automatically enter stable weight values in the statistics. This saves you the effort of tapping the [**M+**] function key. The value is printed automatically.

When this function is activated [**On**], the criteria for automatic entry can be defined via the [**Define**] button.

- 1 Press [].
⇒ A window with application-dependent settings is displayed.
- 2 Under **Autom. WeightEntry**, tap the associated button.
⇒ **Autom. WeightEntry** window is displayed.
- 3 Tap [**On**] and subsequently the [**Define**] button.
- 4 Change the settings and confirm with [**OK**].

5 To exit the menu item, tap [OK].

The following parameters can be defined:

Parameters	Explanation	Values
Limit	This value defines which limit must be exceeded for automatic entry.	User-defined
Delay time	When the limit is exceeded, the Delay time is started, and when it times out the value is captured and entered in the statistics or transferred over the interface.	User-defined (displayed in seconds)

Factory setting: [Off] Automatic entry disabled.

8.1.4 Specific protocol information for statistics

Navigation:  > [Statistics] >  > **Protocol**

Here you define which data appears in the protocols. This large menu item is divided into three sub-menus. They enable you to make additional settings for the application. The rest of the available protocol data corresponds to the data for the **Weighing** application and is not described here.

The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.

► Application is activated.

1 Press .

⇒ A window with application-dependent settings is displayed.

2 Under **Protocol**, tap the [Define] button.

⇒ **Protocol** window is displayed.

3 Under (e.g. **Header**), tap the [Define] button.

4 Select an information key by tapping.

⇒ The information key is automatically numbered.

5 To restore the factory default settings, tap [STD].

6 To exit the menu item, tap [OK].

The arrow buttons can be used to page forward or back to a menu page.

Note

The results and data can be printed out at any time.

► A printer is connected and activated as an output device in the peripheral device settings.

– To print out the settings, press .

The following parameters can be defined:

Menu item	Explanation	Further information
Header	Define the information to be printed in the protocol header (before the results).	See Protocol header
Single value	Define the information to be recorded for each single result.	See Recording single values
Result	Define which statistical data is to be recorded.	See section Recording of results

Header line of protocols

Use this sub-menu to define which data is printed in the protocol header (before the results).

The header is printed automatically for series weighings when the first weight value is entered in the statistics by tapping the [M+] function key.

However, the header can also be printed separately by tapping the [**Header**] function key.

The following parameters can be defined:

Values	Explanation
Plausibility	Recorded the defined limit for the plausibility of weight values.
Max n	Recorded the defined maximum number of weighings in the series.
Nom.,+Tol,-Tol	Recorded the defined nominal weight and the defined plus and minus tolerances.

Factory setting: **Appl. Name** and **Date/Time** enabled in this order.

Recording of single values

The following parameters can be defined:

Values	Explanation
Plausibility	Recorded the defined limit for the plausibility of weight values.
Max n	Recorded the defined maximum number of weighings in the series.
Nom.,+Tol,-Tol	Recorded the defined nominal weight and the defined plus and minus tolerances.

Tap the [**M+**] function key to enable automatic printing of single values during a series of weighings.

An single value can also be printed separately by pressing the [] key.

Factory setting: **Net** enabled.

Recording of results

Here you can define which additional data is to be recorded in the results protocol.

The result protocol can be printed by pressing the [] key with the result window.

If a specific number of samples [**Max n**] is defined for a weighing series, the results protocol is automatically printed after the weight of the last sample has been entered in the statistics.

The following parameters can be defined:

Values	Explanation
Max n	Recorded the defined maximum number of weighings in the series.
Nom.,+Tol,-Tol	Recorded the defined nominal weight and the defined plus and minus tolerances.
>Tol+,<Tol-	Recorded the number of weighings that are outside the tolerance range.
n	Recorded the number of weighed samples.
x	Recorded the average weight of the total number of samples. The value is recorded with the current display unit. The resolution of the recorded value is ten times higher than the resolution of the measured value with the highest resolution in the series.
s	Recorded the standard deviation as an absolute value. The value is recorded with the current display unit. The resolution of the recorded value is ten times higher than the resolution of the measured value with the highest resolution in the series. Note The value is only recorded if there are at least three values in the statistics. Otherwise a dash is shown instead of a value.
s.rel	Recorded the relative standard deviation within the series as a percentage. The value is always recorded with a resolution of two decimal places. Note The value is only recorded if there are at least three values in the statistics. Otherwise a dash is shown instead of a value.

Min,Max,Diff	Max = Recorded the highest measured weight of the current series. The number of decimal places and the unit are the same as those used to display the result when the measured value was entered.
	Min = Recorded the lowest measured weight of the current series. The number of decimal places and the unit are the same as those used to display the result when the measured value was entered.
	Diff. = Recorded the difference between the highest and lowest measured weights in the current series. The value is recorded with the current display unit. The number of decimal places of the recorded value corresponds to the number of decimal places of the highest or lowest weight with the highest resolution.
Sum	Recorded the total weight of all saved individual weighings. The value is recorded with the current display unit. The number of decimal places corresponds to the number of decimal places of the measured value with the highest resolution in the series.

Factory setting: **n**, **x**, **s** and **s.rel** are enabled in this order.

8.1.5 Enable additive mode

Navigation:  > **[Statistics]** >  > **Additive Weighing**

You can use this menu item to enable or disable additive mode. When additive mode is enabled, it is not necessary to remove the samples from the weighing pan during a series of weighings.

- 1 Press .
 - ⇒ A window with application-dependent settings opens.
- 2 Tap the **[On]** button for **Additive Weighing**.

The following parameters can be defined:

Parameters	Explanation	Values
Off	Additive mode is disabled.	None
On	Additive mode is enabled. The balance is automatically tared after a weighing result has been entered in the statistics, either manually or automatically. The next sample can be weighed out without removing the previous sample from the weighing pan.	None

Factory setting: **[Off]**.

8.1.6 Define plausibility limits

Navigation:  > **[Statistics]** >  > **PlausibilityCheck**

Plausibility checking is a security precaution. It prevents the entry of incorrect values in the statistics. Here you can define the limit value (as percentage) for the plausibility of the weighing results.

Example

With a plausibility limit of 30%, all weight values that are within $\pm 30\%$ of the nominal or average value are regarded as plausible and are entered in the statistics. All other weight values are ignored and excluded from the statistics.

Note

When you have defined a nominal weight value and tolerance limits, make sure that the plausibility limit for the weight is greater than the selected tolerance limits. Otherwise values that are actually within tolerance may not be entered in the statistics.

See Weighing out to a nominal value (page 138).

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.

- 2 Under **PlausibilityCheck**, tap the associated button.
 - ⇒ A numeric input window is displayed.
- 3 Enter the value and confirm with **[OK]**.

Parameters	Explanation	Values
Plausibility-Check	Define the plausibility limit for measured values. The percentage relates to the defined nominal value. If no nominal value is defined, the limit relates to the average of the already weighed out samples of a weighing series.	any (30 %)*

* Factory setting

8.1.7 Settings for the LV11 tablet feeder

Navigation:  > **[Statistics]** >  > **Tablet Feeder**

If you use the METTLER TOLEDO LV11 tablet feeder, you can configure the settings for this peripheral device here.

Note

If you connect an LV11 to your balance, you have to configure the interface appropriately in the system settings.

See Peripherals (page 73).

► **Tablet Feeder** is activated.

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **Tablet Feeder**, tap the **[Define]** button.
 - ⇒ **Tablet Feeder** window is displayed.
- 3 Settings can be changed by tapping the associated button.
- 4 To exit the menu item, tap **[OK]**.

The following parameters can be defined:

Parameters	Explanation	Values
Feed Rate	Defines the feed rate.	slow normal* fast very fast
On	Activates/deactivates the emptying function. On = the feed tray of the LV11 is automatically emptied after weighing the last sample of a weighing series. Off = no automatic emptying.	On Off*

* Factory setting

8.2 Working with the Statistics application

Navigation:  > **[Statistics]**

This section describes how to use the **Statistics** application. Among other things, you can determine a tare weight, change the resolution of the weighing result or use identifiers.

You are probably already familiar with these options from the **Weighing** application. They are therefore not described again here.

8.2.1 Capturing statistics from a weighing series

For optimal use of the statistical functions, you should have a printer connected to your balance. Otherwise we recommend that you enable the four statistical data fields that are the most important for your application (e.g. **n**, **x**, **s** and **Sum**).

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

Initial settings

To use statistics, you must enable at least the following three function keys:



M+

- Enable function keys.



Result



CL Result

We also recommend enabling the following two function keys: They allow you to delete incorrect values [**CL Last**] and to define the number of samples to be included in a series of weighings [**Max n**].



CL Last

- Enable additional function keys.



Max n

Procedure

Series weighing

If the number of samples to be weighed out for a series is specified, tap the [**Max n**] function key and enter the number of samples (1 to 999). The series is terminated automatically after the last sample has been weighed out. The result window is opened and the result log is printed. This function key is only active when no measurement data is present in the statistics. If you enter 0 (zero) for [**Max n**], the series does not have a defined limit and you can weigh out a maximum of 999 samples.

When working with a weighing container, place the container on the balance and press the [**→T←**] key to tare the balance.

Alternatively you can use the tare memory or the automatic taring function. These functions are described in the instructions for the **Weighing** application.

Note

If you start a weighing series with a user-defined weighing unit, the unit cannot be changed until the series of measurements is finished.

See Defining free weighing units (page 99).

- ▶ Function keys are activated.
 - ▶ The balance is tared [**→T←**].
- 1 Tap [**Max n**].
 - ⇒ A numeric input window is displayed.
 - 2 Enter the number and confirm with [**OK**].
 - 3 Load the first sample and tap the [**M+**] function key.
 - ⇒ When the weight is stable (the dashes disappear), it is entered in the statistics.
 - ⇒ The protocol header and the result (single value) of the current weighing are printed.

- 4 Remove the first sample.
If the additive mode is activated, the sample can remain on the weighing pan. The balance is automatically tared after each weight is entered in the statistics.
- 5 Load further samples in succession. Confirm each weight with the **[M+]** function key (unnecessary if automatic weight entry is activated).
- 6 Remove the sample and tare the balance (unnecessary if additive mode is activated).
 - ⇒ Each value is automatically recorded after being entered in the statistics.
 - ⇒ After the last sample is weighed, the result window is automatically opened and printed.
 - ⇒ The result window contains the results of a series of weighings. The information selected for result recording is displayed.
If the result window consists of several screen pages, paging between the individual pages can take place with the two arrow keys.
- 7 Tap **[CL Result]** to end measurement and clear the memory for the next series.
 - ⇒ A confirmation window is displayed.
- 8 To delete the statistics, confirm with **[OK]**.
 - ⇒ The statistics are deleted.
 - ⇒ The function key is inactive and grayed.

Sample weighing

- ▶ Function keys are activated.
 - ▶ The balance is tared **[→T←]**.
- 1 Load the sample and tap the **[M+]** function key.
 - ⇒ When the weight is stable (the dashes disappear), it is entered in the statistics.
 - ⇒ The protocol header and the result (single value) of the current weighing are printed.
 - 2 Remove the sample.
 - 3 Tap **[Result]**.
 - ⇒ The result window is displayed.
If the result window consists of several screen pages, paging between the individual pages can take place with the two arrow keys.
 - 4 Press **[Print]** to print the result protocol.
 - 5 Tap **[OK]** to exit the result window.
 - 6 Tap **[CL Result]** to end measurement and clear the memory for the next series.
 - ⇒ A confirmation window is displayed.
 - 7 To delete the statistics, confirm with **[OK]**.
 - ⇒ The statistics are deleted.
 - ⇒ The function key is inactive and grayed.

Note

An error message is displayed if you tap the **[M+]** function key but no weight change has occurred. This prevents you from accidentally acquiring the sample twice.

If you have mistakenly weighed out an incorrect amount and stored the weighing result, you can use the **[CL Last]** function key to cancel the last value. It is only available if values are already present in the memory; otherwise the key is grayed out and cannot be actuated. The key is disabled after a value is deleted and is not enabled again until the next value has been entered in the statistics.

If a weight value is outside the plausibility limit, a corresponding error message is displayed after the [M+] key is tapped. The value cannot be entered in the statistics. No error message is displayed if automatic weight entry is enabled. However, the value is not entered in the statistics and it does not appear in the statistics protocol.

8.2.2 Weighing out to a nominal value

The **Statistics** application provides additional functions that simplify weighing out samples to a defined nominal value. You can use these functions for individual weighings or for series weighings with statistics.

Initial settings

To enter the nominal weight and the associated tolerance range, enable the function keys listed below. Also enable the data fields with the same names so that the defined values will be displayed.



Nominal – Enable function keys.



+Tolerance



-Tolerance

Procedure

Important

Ensure that the plausibility limit is greater than the defined tolerance values. Weights that are within the tolerance range but greater than the plausibility limit cannot be entered in the statistics. If necessary, change the plausibility limit for the weight values.

See Define plausibility limits (page 134).

Note

The function keys for entering the nominal weight and the tolerance range are disabled if values are already present in the statistics. In this case, you must clear the statistics with the [CL Last] function key before you can define the nominal weight and the tolerance range.

- ▶ Function keys are activated.
 - ▶ Statistics are deleted.
- 1 Tap the [**Nominal**] function key.
 - ⇒ A numeric input window is displayed.
 - 2 Enter the required value.
 - If a weight corresponding to the nominal weight is already on the balance, it can be directly taken over by tapping the button with the balance icon.
 - Check the weighing unit to the right of the nominal weight.
 - A selection of available units can be displayed by tapping the weighing unit.
- Note**
Units are not converted automatically. When a value is entered in a unit, it is retained, even when the unit is changed.
- 3 Confirm with [**OK**] to activate the nominal weight.
 - 4 Tap the [**+Tolerance**] and/or [**-Tolerance**] function key.
 - ⇒ A numeric input window is displayed.
 - 5 Enter the required value.
 - Both tolerances are set to 2.5% by default. Instead of a percentage, an absolute tolerance can be entered in any unit, e.g. [**g**].

6 Confirm with [OK] to activate the tolerance.

Note

Samples outside the tolerance range are specifically marked with >T+ or <T- when single values are recorded.

⇒ The **SmartTrac** graphic weighing-in aid with tolerance marks to facilitate weighing-in to the nominal weight is displayed.

⇒ Samples can be roughly weighed until the lower tolerance limit is reached and subsequent additions made up to the nominal weight.

8.2.3 Example protocol with statistical values

The detail of a protocol depends on the selected protocol settings. Only application-specific information is shown in the example printout.

Important information for the interpretation of recorded results

The **x** and **s** values are calculated results that are shown with higher resolution than the individual measured values. The significance of the last decimal place cannot be assured with a relatively small measurement series (fewer than 10 or so measured values) with small weight differences.

Example: Printout

```
----- Statistics -----
25.Jul 2013          16:40
User Name           User 2
Balance Type        XPE204
WeighBridge SNR
                    1234567890
Terminal SNR        1234567891
Balance ID          Lab A/1
Balance is levelled
Plausibility        30 %
Nominal             24.20 g
+Tol                2.5 %
-Tol                2.5 %
 1                  24.21 g
 2                  24.67 g
 3>T                24.91 g
 4                  24.18 g
n                   4
x                   24.493 g
s                   0.357 g
s.rel               1.46 %
Min.                24.18 g
Max.                24.91 g
Diff                0.73 g
Sum                 97.97 g

-----
Signature
.....
-----
```

8.2.4 Formulas used for the calculation of statistical values

Calculation of mean value and standard deviation

Notation

x_i = Individual measured value of a series of n measured values $i = 1..n$

\bar{x} = Mean value and s standard deviation of these measured values

The mean value is given by:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i \quad (1)$$

The commonly used formula for the calculation of the standard deviation s

$$s = \sqrt{\frac{1}{n-1} \sum (x_i - \bar{x})^2} \quad (2)$$

(2) not suitable for numerical calculation, since in measurements where deviations between single values are very small, the square of the difference (between the single value and mean value) can lead to cancellation. In addition, when using this formula, each single measured value must be stored before the standard deviation can be finally determined.

The following formula is mathematically equivalent, but much more stable numerically. It can be derived by appropriate transformation from (1) and (2):

$$s = \sqrt{\frac{1}{n-1} \left\{ \sum_{i=1}^n x_i^2 - \frac{1}{n} \left(\sum_{i=1}^n x_i \right)^2 \right\}}$$

For the calculation of the mean value and standard deviation, only n , $\sum x_i$ and $\sum x_i^2$ need to be stored for the use of this formula.

Standard deviation

The numerical stability can be further improved by measured value scaling.

With $\Delta x_i = x_i - X_0$ whereby X_0 (depending on the application) is either the first measured value of a series of measurements or the nominal value of a series of measurements, the following is obtained:

$$s = \sqrt{\frac{1}{n-1} \left\{ \sum_{i=1}^n (\Delta x_i)^2 - \frac{1}{n} \left(\sum_{i=1}^n \Delta x_i \right)^2 \right\}}$$

Mean value

The mean value is calculated accordingly:

$$\bar{x} = X_0 + \frac{1}{n} \sum_{i=1}^n \Delta x_i$$

Relative standard deviation

The relative standard deviation can be calculated using the formula:

$$s_{rel} = \frac{s}{\bar{x}} 100 \quad \text{percent}$$

Number of digits in the results

The mean and standard deviation are always displayed and printed with one decimal place more than the corresponding single measured values. To be noted for interpretation of the results is that this additional decimal place has no significance for small series of measurements (less than about 10 measured values).

This applies similarly to percentages (e.g. relative standard deviation), which always has two decimal places (e.g. 13.45 percent). The significance of the decimal places depends similarly on the magnitude of the original values!

9 Formulation Application

Navigation:  > [Formulation]



This section provides information and descriptions of setting options for practical use of the application.

The majority of application settings are saved under the active user profile. Each user can select specific settings for this application. It must be ensured that the required user profile is selected.

The component and formulation databases are independent of the user profile; there is only one database for all users.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

Selecting the application

- 1 Press .
 - 2 Tap the [Formulation] icon in the selection window.
 - ⇒ The selected application is active.
 - ⇒ Some of the specific formulation function keys and information fields are activated by default (factory defaults).
 - ⇒ Both [Result] and **CL Result** function keys are inactive and therefore grayed out as no formulation is currently active.
- ⇒ The balance is ready for formulation.

9.1 Formulation application settings

Navigation:  > [Formulation] > 

Different specific formulation settings are available. You can use them to adapt the application to your needs. In this application, the **Info Unit** is not available.

Most of the setting options are the same as for the **Weighing** application. Only the settings that differ are described below.

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Menu item	Explanation	Further information
Recipe	Definition of formulations.	See Definition and activation of formulations (page 149)
Component	Definition of components.	See Definition of components (page 149)
Autom. Zeroing	Activates/deactivates automatic zeroing.	see Activation or deactivation of automatic zeroing (page 143)
Function Keys	Defines the formulation function keys that appear at the bottom of the display. These keys enable direct access to specific functions.	See Specific formulation function keys (page 143)
Info Field	Defines the formulation information fields to be displayed.	See Specific formulation information fields (page 144)
Protocol	Selects data to be shown in the weighing protocols.	See Specific formulation protocol information (page 145)
Identification	Defines identifications.	See Specific formulation identifications (page 147)

Smart & ErgoSens	Programs both terminal SmartSens sensors. Up to two external ErgoSens (optional) can be assigned a function in this menu.	See Specific SmartSens and ErgoSens formulation settings (page 148)
-----------------------------	--	--

9.1.1 Activation or deactivation of automatic zeroing

Navigation:  > [Formulation] >  > **Autom. Zeroing**

This menu item can be used to define whether the display is automatically reset to zero after removal of the tare container.

- 1 Press the  key.
⇒ A window with application-dependent settings opens.
- 2 Tap **Autom. Zeroing** on the associated button.
- 3 Tap the associated button.
- 4 To exit the menu item, tap [OK].

The following parameters can be defined:

Parameters	Explanation	Values
On	Activates automatic zeroing. When the container is removed after taring the weighing container and weighing-in a component, the display is automatically reset to zero.	None
Off	Deactivates automatic zeroing.	None

Factory setting: [Off].

9.1.2 Specific formulation function keys

Navigation:  > [Formulation] >  > **Function Keys**

This menu can be used to activate the following specific formulation function keys.

All other function keys are the same as for the **Weighing** application.

- Activate or deactivate function keys by tapping. The sequence of the keys is automatically updated.
 - To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.
- Application is activated.

- 1 Press .
⇒ A window with application-dependent settings is displayed.
- 2 Under **Function Keys**, tap the [Define] button.
- 3 Select a function key by tapping.
⇒ The function key is automatically numbered.
- 4 Change the settings and confirm with [OK].
- 5 To restore the factory default settings, tap [STD].
- 6 To exit the menu item, tap [OK].

The arrow buttons can be used to page forward or back to a menu page.

	Designation	Explanation
	M+	Stores the net weight of a weighed component and resets the weight display to zero.
	Result	Opens the results window.

	CL Result	Clears the results memory.
	Recipe	Opens the recipe database for selecting a recipe.
	Abs/Diff	Switches the weight display between the weighed quantity (Abs = absolute) and the residual quantity to be weighed, until the nominal weight (Diff = difference) is reached.
	Nominal	Defines the desired nominal weight. This also serves as a reference for the tolerances.
	CompDB	Opens the component database for selecting a component.
	+Tol	Defines the accuracy (tolerance range) for weighing to a nominal weight.
	-Tol	Defines the accuracy (tolerance range) for weighing to a nominal weight.

Factory setting: [M+], [Result], [CL Result], [ID] and [Nominal] activated, in this sequence.

9.1.3 Specific formulation information fields

Navigation:  > [Formulation] >  > Info Field

This menu contains the following formulation information fields.

All other data fields are the same as for the **Weighing** application.

The information fields in the display provide constant information on, e.g. set values, measured results.

- Information fields can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all information fields must be deactivated and then activated in the required sequence.

► Application is activated.

1 Press .

⇒ A window with application-dependent settings is displayed.

2 Under **Info Field**, tap the [Define] button.

3 Select **Info Field** by tapping.

⇒ The information field is automatically numbered.

4 Change the settings and confirm with [OK].

5 To restore the factory default settings, tap [STD].

6 To exit the menu item, tap [OK].

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Values	Explanation
Comp. Weight	Displays the current component weight.
Nominal	This function key displays the nominal weight.
Net Tot	Displays the total net weight of all weighed components.
>T+	Shows the number of weighings outside the upper weight tolerance.
<T-	Shows the number of weighings outside the lower weight tolerance.
+Tol	This function key displays the entered tolerance for weighing-in to nominal weight.
-Tol	This function key displays the entered tolerance for weighing-in to nominal weight.

Comp. Counter	Displays the current component counter reading (consecutive number of current component).
Recipe Name	Shows the name of the current formulation.
Recipe ID	Displays the identification entered via the [ID] function key. Note The identification designations ID1 are set to the factory defaults, but can be changed.
Comp. Name	Displays the name of the current component.
Comp. ID	Displays the identification entered via the [ID] function key. Note The identification designations ID2 are set to the factory defaults, but can be changed.
Lot ID	Displays the identification entered via the [ID] function key. Note The identification designations ID3 are set to the factory defaults, but can be changed.
Additional ID	Displays the identification entered via the [ID] function key. Note The identification designations ID4 are set to the factory defaults, but can be changed.

Factory setting: Recipe ID, TareGross and Nominal activated, in this sequence.

9.1.4 Specific formulation protocol information

Navigation:  > **[Formulation]** >  > **Protocol**

Here you define which data appears in the protocols. This large menu item is divided into three sub-menus. They enable you to make additional settings for the application. The rest of the available protocol data corresponds to the data for the **Weighing** application and is not described here.

The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
 - To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.
- ▶ Application is activated.
- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
 - 2 Under **Protocol**, tap the **[Define]** button.
 - ⇒ **Protocol** window is displayed.
 - 3 Under (e.g. **Header**), tap the **[Define]** button.
 - 4 Select an information key by tapping.
 - ⇒ The information key is automatically numbered.
 - 5 To restore the factory default settings, tap **[STD]**.
 - 6 To exit the menu item, tap **[OK]**.

The arrow buttons can be used to page forward or back to a menu page.

Note

The results and data can be printed out at any time.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.

- To print out the settings, press .

The following parameters can be defined:

Menu item	Explanation	Further information
Header	Define the information to be printed in the protocol header (before the results).	See Protocol header
Single value	Define the information to be recorded for each single result.	See Recording single values
Result	Define which statistical data is to be recorded.	See section Recording of results

Header line of protocols

Use this sub-menu to define which data is printed in the protocol header (before the results).

The header is printed automatically when the weight of the first component has been stored during formulation by tapping the **[M+]** function key.

The following parameters can be defined:

Values	Explanation
Recipe Name	Records the name of the current formulation.
Recipe ID	Records the identification of the current formulation entered via the [ID] function key.
Nominal Tot	Records the total nominal weight of all components of the current formulation.
Comp.	Records the number of components of the current formulation.

Factory setting: Appl. Name, Date/Time, Balance Type SNR and Recipe ID activated, in this sequence.

Recording of single values

Single values are automatically printed during formulation by tapping the **[M+]** function key.

An single value can also be printed separately by pressing the  key.

Recipe Name	Records the name of the current formulation.
Recipe ID	Records the identification of the current formulation entered via the [ID] function key.
Nominal Tot	Records the total nominal weight of all components of the current formulation.
Comp.	Records the number of components of the current formulation.
Comp. ID	Records the identification of the current component entered via the [ID] function key ID3 .
Lot ID	Records the identification of the current component entered via the [ID] function key ID2 .
Additional ID	Records the identification of the current component entered via the [ID] function key ID4 .
Comp. Name	Records the name of the current component.
Comp. Counter	Records the current component counter reading (consecutive number of current component).
Nom.,+Tol,-Tol	Recorded the defined nominal weight and the defined plus and minus tolerances.
Net %	Records the weight of the current component in % of the nominal weight.
Diff.	Records the difference between the actual and nominal weight of the current component.
Diff. %Net %	Records the percentage deviation of the actual weight of the current component from its nominal weight.

Factory setting: Net enabled.

Recording of results

Here you can define which additional data is to be recorded in the results protocol.

The result protocol can be printed by pressing the  button with the result window open or automatically after taking over the last component of a formulation.

Recipe Name	Records the name of the current formulation.
--------------------	--

Recipe ID	Records the identification of the current formulation entered via the [ID] function key.
Nominal Tot	Records the total nominal weight of all components of the current formulation.
Comp.	Records the number of components of the current formulation.
Comp. Counter	Records the current component counter reading (consecutive number of current component).
>Tol+,<Tol-	Recorded the number of weighings that are outside the tolerance range.
Net Tot	Records the total net weight of all weighed components.

Factory setting: Tare, Net Tot, Gross, Signature, Dash Line and 3 Blank Lines activated, in this sequence.

9.1.5 Specific formulation identifications

Navigation: [☰] > [Formulation] > [☰] > Identification

This menu item can be used to activate the 4 identifications available for formulation via the [ID] function key. Individual identifications can be deactivated or their designations replaced with specific texts (max. 20 characters). The entered designations also appear as information field designations and are printed in weighing protocols. The two headers for the weighing protocols can be defined here; these are printed in the weighing protocols.

Note

The [Recipe ID] and [Comp. ID] are not required for the automatic processing of predefined formulations. These are automatically taken over from the formulation or component database. Further IDs can be activated if additional designations are required for formulation.

For free formulation (without using the databases), the [Recipe ID] and [Comp. ID] can be activated to assign a designation to the formulations and components.

- 1 Press [☰].
⇒ A window with application-dependent settings is displayed.
- 2 Under **Identification**, tap the [Define] button.
⇒ **Identification** window is displayed.
- 3 Settings can be changed by tapping the associated button.
⇒ An alphanumeric input window is displayed.
- 4 Enter the designation and confirm with [OK].
- 5 To exit the menu item, tap [OK].

The arrow buttons can be used to page forward or back to a menu page.

Menu structure

Main menu	Submenu	Further information
Title 1	T1	See Definition of identifications and protocol headers (page 107)
Title 2	T2	
ID1 Name	Recipe ID	See Section Identifications
ID2 Name	Comp. ID	
ID3 Name	Lot ID	
ID4 Name	Additional ID	

Identifications

The following designations are defined by default for the 4 identifications.

The following parameters can be defined:

Parameters	Explanation	Values
Recipe ID	Activates/deactivates the ID and designation (max. 20 characters).	Off On*
Comp. ID	Activates/deactivates the ID and designation (max. 20 characters).	Off* On

Lot ID	Activates/deactivates the ID and designation (max. 20 characters).	Off* On
Additional ID	Activates/deactivates the ID and designation (max. 20 characters).	Off* On

* Factory setting

9.1.6 Specific SmartSens and ErgoSens formulation settings

Navigation:  > [Formulation] >  > **Smart & ErgoSens**

Additional settings are available for the SmartSens and ErgoSens sensors.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

Note

The settings [Recipe ID], [Comp. ID], [Lot ID] and [Additional ID] correspond to the identifications [ID1] ... [ID4], which are also available in the **Weighing** application.

When one of the functions is activated, the green **F** symbol (Function) lights up in the status bar below the respective sensor.

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **Smart & ErgoSens**, tap the [Define] button.
 - ⇒ A selection window is displayed.
- 3 Select the required menu item (e.g. **SmartSens left**).
 - ⇒ A selection window is displayed.
- 4 Select the function by tapping the button.
- 5 To exit the menu item, tap [OK].

Menu structure

Main menu	Submenu	Further information
SmartSens left	Off Door ->0<- ->T<- Print Result M+ OK Recipe ID Comp. ID Lot ID Additional ID	See Parameter table
SmartSens right	Off Door ->0<- ->T<- Print Result M+ OK Recipe ID Comp. ID Lot ID Additional ID	
ErgoSens 1 (Aux1)	Off Door ->0<- ->T<- Print Result M+ OK Recipe ID Comp. ID Lot ID Additional ID AntiStatic Kit	
ErgoSens 2 (Aux2)	Off Door ->0<- ->T<- Print Result M+ OK Recipe ID Comp. ID Lot ID Additional ID AntiStatic Kit	

The following parameters can be defined:

Values	Explanation
Result	Emulates the function key with the same name. Opens the result window.
M+	Emulates the function key with the same name. Takes over the current value.
OK	Emulates pressing of the button with the same name in the formulation dialog (however not in the menus) for confirmation of entries and actions.

Factory setting: SmartSens left and right configured for door operation (draft shield). Both ErgoSens deactivated, [Off].

9.2 Definition of components

Navigation:  > [Formulation] >  > **Component**

Each formulation consists of one or more components. The components must be defined prior to formulation. The balance contains a component database. This database can store up to 100 components. Each component consists of a name and identification (ID). The firmware checks the entries for plausibility. If a name or ID already used by another component is entered, an error message is displayed. This section describes the procedure for the definition of components.

Note

The component database is independent of the user profile; there is only one component database for all users.

For subsequently changing already defined components, **see** Information on changing existing components and formulations (page 160).

The contents of the component database can be recorded at any time by pressing the  button. The component names and numbers are printed.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .
- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **Component**, tap the [Define] button.
The arrow keys can be used to page between individual pages.
or
Tap the button [Go to] and enter the component number. All of the 100 components can be directly selected in this way.
 - ⇒ The first page of the component database is displayed.
The database contains a total of 20 pages with 5 components respectively.
- 3 Tap the components to be defined.
- 4 Under **Component Name**, tap the associated button.
 - ⇒ An alphanumeric input window is displayed.
- 5 Enter the designation and confirm with [OK].
- 6 Under **Comp. ID**, tap the associated button.
 - ⇒ An alphanumeric input window is displayed.
- 7 Enter the designation and confirm with [OK].
- 8 To exit the menu item, tap [OK].

The following parameters can be defined:

Parameters	Explanation	Values
Component Name	Definition of a designation (max. 20 characters). Note The current designation of the respective product can be used as a name.	Any
Comp. ID	Definition of an identification (max. 20 characters). Note The ID is frequently scanned via a barcode reader for clear assignment of the components to the corresponding product.	Any

9.3 Definition and activation of formulations

Navigation:  > [Formulation] >  > **Recipe**

The balance contains a formulation database in which a maximum of 8 formulations with up to 12 components respectively can be stored. To fully define formulations, the respective components must be available in the component database. Each formulation is stored under a name. The definition of an identification (ID) is only required when work is carried out with **Security Check** or if the ID is to be included in the weighing protocols. The firmware checks the entries for plausibility. If a name or an ID already used by another formulation is entered, an error message is displayed. This section describes the procedure for the definition of formulations.

Note

The formulation database is independent of the user profile; there is only one formulation database for all users.

For subsequently changing already defined components, **see** Information on changing existing components and formulations (page 160).

9.3.1 Formulation with fixed components (absolute nominal weights)

Navigation: > [Formulation] > > Recipe > [Define] > Recipe 2 > [Fix Component]

As long as the menu for the definition of a specific formulation is active, current formulation settings and data can be recorded at any time by pressing the key.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

Example: Printout

```

Recipe 2   Fix Component
Name      Eraphtene
ID        ERA-1
Security Check   Off
Procedure   1 Tare
Component 1
Name      Renith 80 o/o
ID        R80
Component Weight
          24.16 g
+Tolerance  2.50 %
-Tolerance  2.50 %
Component 2
Name      Lorine-BR
ID        LBR
Component Weight
          16.45 g
+Tolerance  2.50 %
-Tolerance  2.50 %
Component 3
Name      Alcohol 90 o/o
ID        Alco 90
Component Weight
          77.00 g
+Tolerance  2.50 %
-Tolerance  2.50 %

```

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **Recipe**, tap the [Define] button.
 - ⇒ **Formulation** window is displayed.
- 3 Tap, e.g. **Recipe 2** and subsequently the [Off] button.
 - ⇒ **Recipe 2** window is displayed.
- 4 Tap [Fix Component] and subsequently the [Define] button.

- ⇒ A window with application-dependent settings is displayed.
- 5 Under **Recipe Name**, tap the associated button.
 - ⇒ An alphanumeric input window is displayed.
- 6 Enter the designation and confirm with [**OK**].
- 7 Under **Recipe ID**, tap the associated button.
 - ⇒ An alphanumeric input window is displayed.
- 8 Enter the designation and confirm with [**OK**].
- 9 Under **Security Check**, tap the associated button.
- 10 Activate/deactivate **Security Check**.
- 11 Under **Procedure**, tap the associated button.
- 12 Select a process.
- 13 Change the menu page with the arrow keys.
- 14 Tap the button of the component to be included in the formulation.
 - ⇒ A window is displayed in which the component can be activated.
- 15 Tap [**Component**] and subsequently the [**Define**] button.
 - ⇒ A selection window is displayed.
- 16 Under **Component Name** or **Comp. ID** tap the associated button.
 - ⇒ A window with the component database is displayed.
- 17 Select the component by tapping.
- 18 Under **Component Weight**, tap the associated button.
 - ⇒ A numeric input window is displayed.
- 19 Enter the value and confirm with [**OK**].
- 20 Under **+Tolerance** and/or **-Tolerance** tap the associated button.
 - ⇒ A numeric input window is displayed.
- 21 Enter the value and confirm with [**OK**].
- 22 To exit the menu item, tap [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

Formulation parameters

The following parameters can be defined:

Parameters	Explanation	Values
Recipe Name	Definition of a designation (max. 20 characters).	Any
Recipe ID	Definition of an identification (max. 20 characters). Note The definition of an identification (ID) is only required when work is carried out with Security Check or the ID is to be included in the weighing protocols.	Any
Security Check	With Security Check activated, the entry of a formulation ID (and component IDs) is required for each formulation. Formulation is only continued when these correspond to the formulation data. This ensures that work is carried out with the correct formulation and the correct components are weighed.	On Off*

Procedure	<p>1 Tare = all components are weighed in 1 container. Only a single taring is necessary at the start of formulation.</p> <p>n Tare = each component is weighed in its own container. Taring must be performed prior to each weighing-in operation.</p>	1 Tare* n Tare
------------------	---	-------------------------

* Factory setting

Component parameters

The following parameters can be defined:

Parameters	Explanation	Values
Component Name	Definition of components from the component database (max. 100 components).	Component database
Comp. ID	Definition of components from the component database (max. 100 components).	Component database
Component Weight	Definition of the required nominal weight.	Any (0.00 g)*
+Tolerance	Definition of accuracy (tolerances) for weighing-in to a nominal weight.	Any (2.50%)*
-Tolerance	Definition of accuracy (tolerances) for weighing-in to a nominal weight.	Any (2.50%)*

* Factory setting

9.3.2 Formulation with % components (relative nominal weights)

Navigation:  > [Formulation] >  > Recipe > [Define] > Recipe 3 > [% Component]

The definition of formulations with components with relative nominal weights, differs only slightly from that for formulations with absolute components. Instead of an absolute nominal weight, a percentage nominal weight must be entered. This refers, depending on the selected **Basis**, to either the total formulation weight or the first component.

Note

For formulations with relative nominal component values, no formulation process can be selected as all components are weighed in 1 container.

As long as the menu for the definition of a specific formulation is active, current formulation settings and data can be recorded at any time by pressing the  key.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

Example: Printout

with relative nominal weights based on the total weight

with relative nominal weights based on the first component

Recipe 3	% Component
Name	Iorex-MP
ID	IORX
Security Check	Off
Basis	Total weight
Component 1	
Name	UM Powder A
ID	UPA
Component %	22.6 %
+Tolerance	2.00 %
-Tolerance	2.00 %
Component 2	
Name	UM Powder B
ID	UPB
Component %	77.4 %
+Tolerance	3.00 %
-Tolerance	3.00 %

Recipe 4	% Component
Name	Meranit-411
ID	ME-411
Security Check	Off
Basis	1. Comp. Weight
Component 1	
Name	RF Subst. A
ID	RF-A
Component %	75.0 %
+Tolerance	2.50 %
-Tolerance	2.50 %
Component 2	
Name	Sirine Liq. 16
ID	SI-LIQ
Component %	40.0 %
+Tolerance	1.50 %
-Tolerance	1.00 %

- 1 Press .
- ⇒ A window with application-dependent settings is displayed.
- 2 Under **Recipe**, tap the **[Define]** button.
- ⇒ **Formulation** window is displayed.
- 3 Tap, e.g. **Recipe 3** and subsequently the **[Off]** button.
- ⇒ **Recipe 3** window is displayed.
- 4 Tap **[% Component]** and subsequently the **[Define]** button.
- ⇒ A window with application-dependent settings is displayed.
- 5 Under **Recipe Name**, tap the associated button.
- ⇒ An alphanumeric input window is displayed.
- 6 Enter the designation and confirm with **[OK]**.
- 7 Under **Recipe ID**, tap the associated button.
- ⇒ An alphanumeric input window is displayed.
- 8 Enter the designation and confirm with **[OK]**.
- 9 Under **Security Check**, tap the associated button.
- 10 Activate/deactivate **Security Check**.
- 11 Under **Basis**, tap the associated button.
- 12 Select a process.
- 13 Change the menu page with the arrow keys.
- 14 Tap the button of the component to be included in the formulation.
- ⇒ A window is displayed in which the component can be activated.
- 15 Tap **[Component]** and subsequently the **[Define]** button.
- ⇒ A selection window is displayed.
- 16 Under **Component Name** or **Comp. ID** tap the associated button.
- ⇒ A window with the component database is displayed.
- 17 Select the component by tapping.
- 18 Under **Component %**, tap the associated button.
- ⇒ A numeric input window is displayed.
- 19 Enter the value and confirm with **[OK]**.

20 Under **+Tolerance** and/or **-Tolerance** tap the associated button.

⇒ A numeric input window is displayed.

21 Enter the value and confirm with [**OK**].

22 To exit the menu item, tap [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

Formulation parameters

The following parameters can be defined:

Parameters	Explanation	Values
Recipe Name	Definition of a designation (max. 20 characters).	Any
Recipe ID	Definition of an identification (max. 20 characters). Note The definition of an identification (ID) is only required when work is carried out with Security Check or the ID is to be included in the weighing protocols.	Any
Security Check	With Security Check activated, the entry of a formulation ID (and component IDs) is required for each formulation. Formulation is only continued when these correspond to the formulation data. This ensures that work is carried out with the correct formulation and the correct components are weighed.	On Off*
Basis	Total weight = the nominal percentage of each component is based on the total weight (final weight) of the formulation. For formulation, the required final weight must be entered first. The nominal weights of the individual components are additionally automatically calculated in percent. Note For formulations with nominal percentages based on the total weight. The balance does not check whether the total percentage of all components is 100%. If this value is above or below 100%, the calculated percentages or the nominal weights to be weighed are automatically adjusted during the weighing operation, as illustrated in the following example : Formulation data: nominal weight of first component: 80 %, nominal weight of second component: 40%, final weight: 100 g. Automatic calculation of the nominal weights to be weighed: First component: $80\%/120\% \cdot 100 \text{ g} = 66.67 \text{ g}$ Second component: $40\%/120\% \cdot 100 \text{ g} = 33.33 \text{ g}$ 1. Comp.Weight = for formulation, the nominal weight of the first component must be entered. This weight corresponds to the percentage defined in the formulation definition. The nominal weights of the further components are subsequently calculated automatically in relation to the first component. Example of a formulation with two components 75% is defined for the first component. 40% is defined for the second component. For formulation, a nominal weight of 100 g is defined for the first component. The balance now calculates for the second component a nominal weight of 53.33 g ($100 \text{ g}/75\% \cdot 40\% = 53.33 \text{ g}$).	Total weight* 1. Comp.Weight

* Factory setting

Component parameters

The following parameters can be defined:

Parameters	Explanation	Values
Component Name	Definition of components from the component database (max. 100 components).	Component database
Comp. ID	Definition of components from the component database (max. 100 components).	Component database
Component %	Definition of the required nominal weight.	Any (0.00 g)*
+Tolerance	Definition of accuracy (tolerances) for weighing-in to a nominal weight.	Any (2.50%)*
-Tolerance	Definition of accuracy (tolerances) for weighing-in to a nominal weight.	Any (2.50%)*

* Factory setting

9.4 Working with the formulation application

Navigation:  > [Formulation]

This section describes the procedure for working with the application **Formulation** and recording the results.

9.4.1 Initial settings

A printer must be connected to the balance for recording formulations.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

The most important information fields for the application must also be activated (e.g. **Recipe Name**, **Comp. Name**, **Nominal** and **Comp. ID** for the automatic processing of formulations.

Depending on the type of formulation, further function keys must be activated.

For each formulation, at least the three following functions keys must be activated.



M+ – Enable function keys.



Result



CL Result

For free formulation without using formulations from the database, the following function keys must also be activated. The respective values can be entered via these keys.



Nominal – Enable function keys.



+Tolerance



-Tolerance

For free formulation, the **ID** function key must be activated. This allows specific designations to be assigned to the formulations and components. The activation of this function key can also be useful for automatic formulation processing for the assignment of one or two specific IDs to components in addition to those already predefined, e.g. a **Lot ID**.



ID – Function key activation.

When working with components from the component database for free formulation, the **CompDB** function key must also be activated. This function key can be used to display components from the database.



CompDB – Function key activation.

For the automatic processing of formulations from the database, the **Recipe** function key must be activated, which can also be used for formulation display.



Recipe – Function key activation.

The **Abs/Diff** function key should also be activated. This allows the weight display to be switched between an already weighed quantity of a component and the remaining quantity to be weighed.



Abs/Diff – Function key activation.

9.4.2 Free formulation (formulation without using the formulation database)

For using one or several components from the data base for free formulation, the **[CompDB]** function key must be activated. This function key can be used for directly accessing the component database and selecting the required component. In this case, no component ID needs to be entered; this is taken over directly from the database.

When working with a weighing container, place the container on the balance and press the **[→T←]** key to tare the balance.

Note

The weight display can be switched between an already weighed component quantity and the remaining quantity to be weighed with the **[Abs/Diff]** function key at any time.

If the remaining quantity display (difference) has been selected with the **[Abs/Diff]** function key prior to entering the nominal weight, the nominal weight is displayed with a negative sign (weighing-in against zero).

- ▶ Function keys are activated.
 - ▶ The balance is tared **[→T←]**.
- 1 Tap **[ID]**.
or
Tap **[CompDB]**.
⇒ An alphanumeric input window is displayed.
 - 2 Enter the designation and confirm with **[OK]**.
 - 3 To exit the menu without saving, tap **[C]**.
 - 4 Tap the **[Nominal]** function key.
⇒ A numeric input window is displayed.
 - 5 Enter the required value for the first component.
- If a weight corresponding to the nominal weight is already on the balance, it can be directly taken over by tapping the button with the balance icon.
Check the weighing unit to the right of the nominal weight.
A selection of available units can be displayed by tapping the weighing unit.
 - 6 Confirm with **[OK]** to activate the nominal weight.
 - 7 Tap the **[+Tolerance]** and/or **[-Tolerance]** function key.
⇒ A numeric input window is displayed.

- 8 Enter the required value.
- 9 Confirm with **[OK]** to activate the tolerance.

Note
Samples outside the tolerance range are specifically marked with **>T+** or **<T-** when single values are recorded.

 - ⇒ The **SmartTrac** graphic weighing-in aid with tolerance marks to facilitate weighing-in to the nominal weight is displayed.
- 10 Weigh the first component.
- 11 When the nominal weight is reached or the weight is within the tolerances, tap the **[M+]** function key to store the value.

The weight must be previously verified again as the balance does not check whether the weighed value corresponds to the nominal weight.

 - ⇒ The protocol header and the result (single value) of the current component are printed.
 - ⇒ The balance is ready for weighing the second component.
- 12 If a new weighing container is used, the container with the first component must be removed and the balance zeroed **[→0←]**. Place a new container on the balance and tare the balance **[→T←]**.
If the second component is weighed in the same container, taring is unnecessary.
- 13 Define the nominal weight and tolerances.
- 14 Weigh the second component.
- 15 The result can be stored by tapping the **[M+]** function key.
 - ⇒ The determined single value is automatically recorded based on specific requirements.
- 16 Tap **[Result]**. Only available when values are stored, otherwise the key is grayed and cannot be actuated.
 - ⇒ The result window is displayed.
The information selected for result recording is displayed.
- 17 Press **[☰]** to print the formulation.
- 18 Tap **[OK]** to exit the result window.
- 19 Tap **[CL Result]** to end the formulation and delete the memory for the next formulation.
 - ⇒ A confirmation window is displayed.
- 20 Confirm deletion of the formulation with **[OK]**.
 - ⇒ The formulation is deleted.
 - ⇒ The function key is inactive and grayed.

Weighing further components

The procedure is the same as for the second component with the same or new weighing container.

9.4.3 Automatic formulation processing with "fixed components" (absolute nominal weights)

It is assumed that the relevant formulation has been defined and the required function keys and information fields are activated.

If the formulation definition requires that each component is weighed in its own container, a request is made prior to weighing the second component to place the new weighing container on the balance and press the **[→T←]** key. If the formulation definition requires that all components are weighed in the same container, taring does not need to be repeated. If automatic zeroing is activated, the display is automatically set to zero when the tare container is removed.

When working with a weighing container, place the container on the balance and press the **[→T←]** key to tare the balance.

Note

The user is responsible for ensuring that the weights are within the defined tolerances as the balance does not check this automatically. If an incorrect weight is taken over with the **[M+]** function key, the formulation result will also be incorrect.

Once a formulation is displayed, neither the identification of the formulation **Recipe ID** nor those of the components **Comp. ID** can be changed as these are part of the respective formulation or component definition in the databases.

If the **[Recipe]** function key is grayed, a new formulation cannot be selected as a formulation is being processed. In this case, tap the **[CL Result]** function key to end the current formulation.

The weight display can be switched between an already weighed component quantity and the remaining quantity to be weighed with the **[Abs/Diff]** function key at any time.

► Function keys are activated.

► Formulations are defined.

1 Tap **[Recipe]**.

⇒ A selection window is displayed.

2 Select a formulation from the formulation database by tapping. The formulation is processed immediately after selection.

⇒ An instruction window is displayed.

3 Place the weighing container on the balance and press the **[→T←]** key.

⇒ The balance is tared and ready for weighing the first component.

4 Weigh the first component.

Refer to the graphic **SmartTrac** weighing-in aid with tolerance marks to facilitate weighing-in to the nominal weight. This display must be closely observed as the balance does not check for correspondence between the weighed and nominal weight.

5 When the nominal weight is reached or the weight is within the tolerances, tap the **[M+]** function key to store the value.

⇒ The protocol header and the result (single value) of the current component are printed.

⇒ The balance is ready for weighing the second component.

⇒ The **[Result]** function key is active and the result window can be opened. Information on the current formulation status is displayed.

6 Weigh the second component.

7 The result can be stored by tapping the **[M+]** function key.

⇒ The determined single value is automatically recorded based on specific requirements.

⇒ When all formulation components have been weighed, the formulation result window is automatically displayed. The information selected for result recording is displayed. The formulation protocol is simultaneously completed.

8 Tap **[OK]** to exit the result window.

9 Tap **[CL Result]** to end the formulation and delete the memory for the next formulation.

⇒ A confirmation window is displayed.

10 Confirm deletion of the formulation with **[OK]**.

⇒ The formulation is deleted.

⇒ The function key is inactive and grayed.

Weighing further components

The procedure is the same as for the second component with the same or new weighing container.

9.4.4 Automatic formulation processing with "% components" (relative nominal weights)

Automatic formulation processing with % **Component** is basically the same as for formulations with **Fix Component**.

Depending on the component weighing method in the formulation definition, a request is initially made after selecting the formulation to enter the required final weight of the formulation or nominal weight of the first component.

The weight display can be switched between an already weighed component quantity and the remaining quantity to be weighed with the **[Abs/Diff]** function key at any time.

- ▶ Function keys are activated.
- ▶ Formulations are defined.
- 1 Tap **[Recipe]**.
 - ⇒ A selection window is displayed.
- 2 Select a formulation from the formulation database by tapping. The formulation is processed immediately after selection.
 - ⇒ An instruction window is displayed.
- 3 Tap the **[Enter]** button
- 4 Enter the required value for the first component.
 - If a weight corresponding to the nominal weight is already on the balance, it can be directly taken over by tapping the button with the balance icon.
 - Check the weighing unit to the right of the nominal weight.
 - A selection of available units can be displayed by tapping the weighing unit.
- 5 Confirm with **[OK]** to activate the nominal weight.
 - ⇒ An instruction window is displayed.
- 6 Place the weighing container on the balance and press the **[→T←]** button.
 - ⇒ The balance is tared and ready for weighing the first component.
 - ⇒ The nominal weight is displayed in the **Nominal** information field. SmartTrac supports weighing-in to the nominal weight.
- 7 When the nominal weight is reached or the weight is within the tolerances, tap the **[M+]** function key to store the value.
 - ⇒ The protocol header and the result (single value) of the current component are printed.
 - ⇒ The balance is ready for weighing the second component.
 - ⇒ The **[Result]** function key is active and the result window can be opened. Information on the current formulation status is displayed.
- 8 Weigh the second component.
- 9 The result can be stored by tapping the **[M+]** function key.
 - ⇒ The determined single value is automatically recorded based on specific requirements.
 - ⇒ When all formulation components have been weighed, the formulation result window is automatically displayed. The information selected for result recording is displayed. The formulation protocol is simultaneously completed.
- 10 Tap **[OK]** to exit the result window.
- 11 Tap **[CL Result]** to end the formulation and delete the memory for the next formulation.
 - ⇒ A confirmation window is displayed.
- 12 Confirm deletion of the formulation with **[OK]**.
 - ⇒ The formulation is deleted.
 - ⇒ The function key is inactive and grayed.

Weighing further components

The procedure is the same as for the second component with the same or new weighing container.

9.4.5 Sample protocol of a formulation

The detail of a protocol depends on the selected protocol settings. Only application-specific information is shown in the example printout.

Example: Printout

```
----- Formulation -----
25.Jul 2013          12:40
User Name           User 3
Balance Type        XPE204
WeighBridge SNR     1234567890
Terminal SNR        1234567891
Recipe              Iorex-MP
Recipe ID           IORX
Num. of Comp.       2
Nominal Tot         84.30 g
Comp. ID            UPA
Comp                1/2
Nominal             19.22 g
+Tol                0.38 g
-Tol                0.38 g
 1      N           19.24 g
 1      N           100.1 %
 1 Diff            0.02 g
 1 Diff            0.1 %
Comp. ID            UPB
Comp                2/2
Nominal             65.08 g
+Tol                1.95 g
-Tol                1.95 g
 2      N           65.21 g
 2      N           100.2 %
 2 Diff            0.13 g
 2 Diff            0.2 %
Net Tot             84.45 g

Signature
.....
-----
```

9.5 Information on changing existing components and formulations

Stored formulation and component definitions can be changed. The following rules apply.

- While a formulation is being processed, neither stored formulations nor components can be changed.
- If a component which is part of a formulation is changed, the error message **This component cannot be changed. It is used by** is displayed. However, if components need to be changed, these must first be deactivated in all respective formulations. If components are to be included again in respective formulations after being changed, the components must be explicitly selected from the component database. Activate the components in the formulation and re-enter the nominal weights and tolerances. Subsequently change the formulation name and ID. This avoids confusion with previous formulations with the old definition.

- Components can be removed from the database by deleting their name or ID. However, this is only possible if the component is not part of a formulation.
- Formulations cannot be deleted from the database. Formulations that are no longer required must be deactivated. If a formulation is no longer required, it can only be removed from the database by overwriting it with a new formulation.

10 Piece Counting Application

Navigation:  > [Piececounting]



This section provides information and descriptions of setting options for practical use of the application.

All application settings are saved under the active user profile. Each user can select specific settings for this application. It must be ensured that the required user profile is selected.

The **Piececounting** application allows you to determine the number of pieces put on the weighing pan. It is advantageous if all pieces are of approximately equal weight, since the unit quantity is determined on the basis of average weight. Various methods can be used to determine the reference unit weight.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

Selecting the application

- 1 Press .
 - 2 Tap the [Piececounting] icon in the selection window.
 - ⇒ The selected application is active.
 - ⇒ Some of the specific function keys and data fields for piece counting are activated by default (factory defaults).
- ⇒ The balance is ready for piece counting.

10.1 Piece counting application settings

Navigation:  > [Piececounting] > 

Several specific settings are available for piece counting. You can use them to adapt the application to your needs.

Most of the setting options are the same as for the **Weighing** application. Only the settings that differ are described below.

Unlike the **Weighing** application, only **one** custom unit can be specified. The **MinWeigh** feature is not available.

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Menu item	Explanation	Further information
FixPcs	Definition of a fixed reference unit quantity.	See Defining the fixed reference unit quantity (page 163)
Function Keys	Define which function keys for piece counting are shown at the bottom of the display. These keys enable direct access to specific functions.	See Specific function keys for piece counting (page 163)
Info Field	Define which data fields for piece counting are displayed.	See Specific data fields for piece counting (page 164)
Autom. Weight-Entry	Activate/deactivate automatic weight entry.	See Specifications for automatic weight entry (page 165)
Display Unit	Define the unit for the result display.	See Additional unit for piece counting (page 165)
Info Unit	Define an additional weighing unit. This appears in the corresponding data field on the display.	See Additional unit for piece counting (page 165)
Protocol	Select data to be shown on the weighing protocol.	See Specific protocol data for piece counting (page 166)

Smart & ErgoSens	Programs the two SmartSens sensors on the terminal. Up to two external ErgoSens (optional) can be assigned a particular function in this menu.	See Specific SmartSens and ErgoSens settings for piece counting (page 168)
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10.1.1 Defining the fixed reference unit quantity

Navigation:  > [Piececounting] >  > **FixPcs**

Here you define which fixed reference quantity the function key [**FixPcs**] refers to.

When carrying out piece counting, each time the function key [**FixPcs**] is tapped, the weight is divided by the defined, fixed reference unit quantity. This determines the reference unit weight on which the piece counting is based.

Note

The function key [**FixPcs**] is labeled with [**Fix n**], with **n** being the selected number of reference units.

Example: [**Fix 10**].

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **FixPcs**, tap the associated button.
 - ⇒ A numeric input window is displayed.
- 3 Change the settings and confirm with [**OK**].
- 4 To exit the menu item, tap [**OK**].
 - ⇒ Function key is labeled with a new reference unit quantity.

Factory setting: [**Fix 10**] PCS.

10.1.2 Specific function keys for piece counting

Navigation:  > [Piececounting] >  > **Function Keys**

This menu item allows you to activate the specific function keys listed below for piece counting.

All other function keys are the same as for the **Weighing** application.

The numbered function keys are displayed in the application at the bottom of the display. The numbers define the sequence in the display.

- Activate or deactivate function keys by tapping. The sequence of the keys is automatically updated.
 - To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.
- ▶ Application is activated.
- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
 - 2 Under **Function Keys**, tap the [**Define**] button.
 - 3 Select a function key by tapping.
 - ⇒ The function key is automatically numbered.
 - 4 Change the settings and confirm with [**OK**].
 - 5 To restore the factory default settings, tap [**STD**].
 - 6 To exit the menu item, tap [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

	Designation	Explanation
	FixPcs	Determines the reference unit weight with a defined, fixed number of pieces.

	VarPcs	Selects the reference unit quantity.
	PcsWgt	Enters the known weight of a reference unit.
	RefOpt	Performs reference optimization.
	M+	Saves the current unit quantity to the memory.
	Result	Opens the results window.
	CL Result	Clears the results memory.
	CL Last	Deletes the last saved value.
	Nominal	Defines the desired nominal unit quantity. This also serves as a reference for the tolerances.
	Abs/Diff	Switches the weight display between the unit quantity already weighed in and the number of units still to be weighed in until the nominal unit quantity is reached.
	+Tol	Defines the accuracy (tolerance range) for piece counting.
	-Tol	Defines the accuracy (tolerance range) for piece counting.
	Max n	Defines the maximum number of piece counts in a series.

Factory setting: [PcsWgt], [FixPcs], [VarPcs] and [Nominal] are activated in this order.

10.1.3 Specific data fields for piece counting

Navigation:  > [Piec counting] >  > Info Field

This menu item provides the data fields listed below for piece counting.

All other data fields are the same as for the **Weighing** application.

The information fields in the display provide constant information on, e.g. set values, measured results.

- Information fields can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
 - To redefine the sequence, all information fields must be deactivated and then activated in the required sequence.
- Application is activated.
- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
 - 2 Under **Info Field**, tap the [Define] button.
 - 3 Select **Info Field** by tapping.
 - ⇒ The information field is automatically numbered.
 - 4 Change the settings and confirm with [OK].
 - 5 To restore the factory default settings, tap [STD].

6 To exit the menu item, tap [OK].

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Values	Explanation
RefPcs	Shows the selected reference unit quantity.
PcsWgt	Shows the reference unit weight.
n	Shows the number of piece counts carried out in a series.
x	Shows the average unit quantity of all piece counts in a series.
s	Shows the standard deviation as an absolute value.
s.rel	Shows the standard deviation as a percentage.
Sum	Shows the unit quantity of all counts in a series.
>T+	Shows the number of piece counts outside the upper weight tolerance.
<T-	Shows the number of piece counts outside the lower weight tolerance.
Min	Shows the smallest measured unit quantity in a series of piece counts.
Max	Shows the largest measured unit quantity in a series of piece counts.
Diff.	Shows the difference between the smallest and largest unit quantity in a series of piece counts.
Nominal	This function key displays the nominal unit quantity.
+Tol	This function key displays the entered tolerance for piece counting.
-Tol	This function key displays the entered tolerance for piece counting.

Factory setting: PcsWgt activated.

10.1.4 Specifications for automatic weight entry

Navigation:  > [Piececounting] >  > Autom. WeightEntry

Here you define whether and under which conditions the balance should automatically enter stable weight values in the statistics. This saves you the effort of tapping the [M+] function key. The value is printed automatically.

When this function is activated [On], the criteria for automatic entry can be defined via the [Define] button.

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **Autom. WeightEntry**, tap the associated button.
 - ⇒ **Autom. WeightEntry** window is displayed.
- 3 Tap [On] and subsequently the [Define] button.
- 4 Change the settings and confirm with [OK].
- 5 To exit the menu item, tap [OK].

The following parameters can be defined:

Parameters	Explanation	Values
Limit	This value defines which limit must be exceeded for automatic entry.	User-defined
Delay time	When the limit is exceeded, the Delay time is started, and when it times out the value is captured and entered in the statistics or transferred over the interface.	User-defined (displayed in seconds)

Factory setting: [Off] Automatic entry disabled.

10.1.5 Additional unit for piece counting

Navigation:  > [Piececounting] >  > Display Unit or Info Unit

The **PCS** unit (piece) is also available beside the known weighing units in the **Display Unit** and **Info Unit** menu topics, provided that a reference unit weight has already been determined.

Note

You do not explicitly need to select the **PCS** unit for piece counting, since the display unit is always automatically switched to **PCS** when the reference unit weight is being determined. Afterwards, you can select the desired unit again at any time, unless you have already saved a value to the memory for a series of piece counts. In this case, switching between **PCS** and the other weighing units is only possible after deleting the results.

- 1 Press [].
⇒ A window with application-dependent settings opens.
- 2 Tap the button next to **Display Unit** or **Info Unit**.
⇒ A selection window appears.
- 3 To change a setting, tap the corresponding button.
- 4 To exit the menu item, tap [**OK**].

Factory setting: g (Grams) for **Display Unit** and **Info Unit**.

10.1.6 Specific protocol data for piece counting

Navigation: [] > [**Piececounting**] > [] > **Protocol**

Here you define which data appears in the protocols. This large menu item is divided into three sub-menus. They enable you to make additional settings for the application. The rest of the available protocol data corresponds to the data for the **Weighing** application and is not described here.

The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.

► Application is activated.

- 1 Press [].
⇒ A window with application-dependent settings is displayed.
- 2 Under **Protocol**, tap the [**Define**] button.
⇒ **Protocol** window is displayed.
- 3 Under (e.g. **Header**), tap the [**Define**] button.
- 4 Select an information key by tapping.
⇒ The information key is automatically numbered.
- 5 To restore the factory default settings, tap [**STD**].
- 6 To exit the menu item, tap [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

Note

The results and data can be printed out at any time.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [].

The following parameters can be defined:

Menu item	Explanation	Further information
Header	Define the information to be printed in the protocol header (before the results).	See Protocol header

Single value	Define the information to be recorded for each single result.	See Recording single values
Result	Define which statistical data is to be recorded.	See section Recording of results

Header line of protocols

Use this sub-menu to define which data is printed in the protocol header (before the results).

The header is printed automatically for piece counts when the first count is entered in the statistics by tapping the [M+] function key.

However, the header can also be printed separately by tapping the [Header] function key.

The following parameters can be defined:

Values	Explanation
Max n	Records the defined maximum number of piece counts in the series.
Nom.,+Tol,-Tol	Records the defined nominal unit quantity and the defined plus and minus tolerances.

Factory setting: Appl. Name, Date/Time, Balance Type and SNR are activated in this order.

Recording of single values

Tap the [M+] function key to activate automatic printing of single values during a series of counts.

An single value can also be printed separately by pressing the [≡] key.

The following parameters can be defined:

Values	Explanation
Nom.,+Tol,-Tol	Records the defined nominal unit quantity and the defined plus and minus tolerances.
RefPcs	Records the selected reference unit quantity.
PcsWgt	Records the defined reference unit weight.
NetPcs	Records the measured net unit quantity.

Factory setting: ID1, Nom.,+Tol,-Tol, Net and NetPcs are activated in this order.

Recording of results

Here you can define which additional data is to be recorded in the results protocol.

The result protocol can be printed by pressing the [≡] key with the result window.

If a specific number of counts [Max n] is defined for a series of piece counts, the results protocol is automatically printed after the weight of the last count has been entered in the statistics.

The following parameters can be defined:

Values	Explanation
Max n	Records the defined maximum number of piece counts in the series.
Nom.,+Tol,-Tol	Records the defined nominal unit quantity and the defined plus and minus tolerances.
>Tol+,<Tol-	Records the number of counts that are outside the tolerance range.
n	Records the number of piece counts carried out in a series.
x	Records the average unit quantity of all counts in a series.
s	Records the standard deviation as an absolute value.
	<p>Note</p> <p>The value is only recorded if there are at least three values in the statistics. Otherwise a dash is shown instead of a value.</p>

s.rel	Records the relative standard deviation within the series as a percentage. The value is always recorded with a resolution of two decimal places. Note The value is only recorded if there are at least three values in the statistics. Otherwise a dash is shown instead of a value.
Min,Max,Diff	Min = Records the smallest measured unit quantity of the current series.
	Max = Records the largest measured unit quantity of the current series.
	Diff. = Records the difference between the smallest and largest unit quantity of the current series.
Sum	Records the total value of all saved individual weighings.
SumPcs	Records the total unit quantity of all saved individual counts.

Factory setting: n, x, s, s.rel, Min, Max, Diff., Sum, SumPcs, Signature and 3 Blank Lines activated.

10.1.7 Specific SmartSens and ErgoSens settings for piece counting

Navigation:  > [Piececounting] >  > Smart & ErgoSens

Additional settings are available for the SmartSens and ErgoSens sensors.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

When one of the functions is activated, the green **F** symbol (Function) lights up in the status bar below the respective sensor.

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **Smart & ErgoSens**, tap the [Define] button.
 - ⇒ A selection window is displayed.
- 3 Select the required menu item (e.g. **SmartSens left**).
 - ⇒ A selection window is displayed.
- 4 Select the function by tapping the button.
- 5 To exit the menu item, tap [OK].

Menu structure

Main menu	Submenu	Further information
SmartSens left	Off Door ->0<- ->T<- Print FixPcs Result M+ OK ID1 ID2 ID3 ID4 Header 1/2d 1/5d 1/10d 1/100d 1/1000d	See Parameter table
SmartSens right	Off Door ->0<- ->T<- Print FixPcs Result M+ OK ID1 ID2 ID3 ID4 Header 1/2d 1/5d 1/10d 1/100d 1/1000d	
ErgoSens 1 (Aux1)	Off Door ->0<- ->T<- Print FixPcs Result M+ OK ID1 ID2 ID3 ID4 Header 1/2d 1/5d 1/10d 1/100d 1/1000d AntiStatic Kit	
ErgoSens 2 (Aux2)	Off Door ->0<- ->T<- Print FixPcs Result M+ OK ID1 ID2 ID3 ID4 Header 1/2d 1/5d 1/10d 1/100d 1/1000d AntiStatic Kit	

The following parameters can be defined:

Values	Explanation
FixPcs	Emulates the same function key. Determines the reference unit weight with a defined, fixed number of pieces.
Result	Emulates the function key with the same name. Opens the result window.
M+	Emulates the function key with the same name. Takes over the current value.
OK	Emulates pressing of the button with the same name in the formulation dialog (however not in the menus) for confirmation of entries and actions.

Factory setting: SmartSens left and right configured for door operation (draft shield). Both ErgoSens deactivated, [**Off**].

10.2 Working with the Piece Counting application

Navigation:  > [**Piececounting**]

This section describes how to work with the **Piececounting** application. Among other things, you can determine a tare weight, change the resolution of the weighing result or work with identifiers.

You are probably already familiar with these options from the **Weighing** application. They are therefore not described again here.

10.2.1 Simple piece counting

Initial settings

To carry out a simple piece counting, you must activate at least the following three function keys:



FixPcs

– Activate function keys.



VarPcs



PcsWgt

Also activate the data fields **PcsWgt** (Reference unit weight) and **RefPcs** (Reference unit quantity) so that the defined values will be displayed.

Determining the reference

Place the desired number of reference units on the weighing pan. Using these reference units, the balance measures the average piece weight. This serves as a basis for the piece counting.

If the number of reference units placed on the balance corresponds exactly to the number that is programmed for the function key [**FixPcs**], tap it. As soon as the weighing result is stable, the measured average piece weight is accepted as a reference. The average weight of the reference units (the number of decimal points depends on the model) and the reference unit quantity appears in the data fields.

If a different number of reference units is placed on the balance, and it does not correspond to the function key [**FixPcs**], e.g. 32 pieces, tap the function key [**VarPcs**] (variable unit quantity). It appears in the input field in which the number of pieces is typed. After confirming the unit quantity, the balance determines the reference. The average weight of the reference units and the reference unit quantity appear in the data fields.

If the piece weight is known, this can be entered directly. To do this, tap the function key [**PcsWgt**]. A data field appears in which the piece weight is typed in the desired unit. Since the balance does not have to determine a reference for this method, after confirming the piece weight, the result of the piece counting is displayed immediately (number of pieces currently placed on the balance). The entered reference unit weight and the reference unit quantity "1" (since you have entered the weight of an individual part) appear in the data fields.

Performing the piece counting

The measured single value can be printed out with the  key.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

Note

If the weight of the piece on the balance is displayed instead of the unit quantity, tap the **[PCS]** unit. Tap the desired weighing unit from the selection window.

- ▶ Function keys are activated.
 - 1 Load the reference units on the weighing pan.
 - 2 Tap, e.g. **[FixPcs]**.
 - ⇒ The measured average piece weight is saved as the reference.
 - 3 Place the pieces to be counted on the balance and tap the **[M+]** function key.
 - ⇒ When the result is stable (the dashes disappear), it is entered in the statistics.
 - ⇒ The protocol header and the result (single value) of the current weighing are printed.
 - 4 Tap **[Result]**.
 - ⇒ The result window is displayed.
If the result window consists of several screen pages, paging between the individual pages can take place with the two arrow keys.
 - 5 Press  to print the result protocol.
 - 6 Tap **[OK]** to exit the result window.
 - 7 Tap **[CL Result]** to end the counting series and delete the memory for the next series.
 - ⇒ A confirmation window is displayed.
 - 8 To delete the statistics, confirm with **[OK]**.
 - ⇒ The statistics are deleted.
 - ⇒ The function key is inactive and grayed.

10.2.2 Totalizing and acquiring statistics from piece counts

Initial settings

In order for you to totalize and acquire statistics, you must activate at least the following three function keys:



M+ – Enable function keys.



Result



CL Result

We also recommend activating the following two function keys. They allow you to delete incorrect values **[CL Last]** and to define the number of piece counts to be included in a series **[Max n]**.

For optimal use of the statistics functions, a printer should be connected to the balance. If a printer is not connected, the four most important statistics information fields for your application should be activated (e.g. **n**, **x**, **Min** and **Max**).

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

Procedure

If the number of piece counts for a series is specified, press the [**Max n**] function key and enter the number of counts (1 to 999). The series is terminated automatically after the last count has been completed. The result window is opened and the result protocol is printed. This function key is only active when no value is present in the statistics. If you enter 0 (zero) for [**Max n**], the series does not have a defined limit and you can statistically record a maximum of 999 piece counts.

When working with a weighing container, place the container on the balance and press the [**→T←**] key to tare the balance.

Alternatively you can use the tare memory or the automatic taring function. These functions are described in the instructions for the **Weighing** application.

Determine the reference with the desired method. Fixed reference unit quantity, variable reference unit quantity or entry of a known piece weight.

- ▶ Function keys are activated.
- ▶ The balance is tared [**→T←**].
- 1 Load the reference units on the weighing pan.
- 2 Tap, e.g. [**VarPcs**].
 - ⇒ A numeric input window is displayed.
- 3 Enter the number of reference units and confirm with [**OK**].
- 4 Place the pieces to be counted on the balance and tap the [**M+**] function key.
 - ⇒ When the result is stable (the dashes disappear), it is entered in the statistics.
 - ⇒ The protocol header and the result (single value) of the current weighing are printed.
- 5 Remove the pieces from the first count.
- 6 Place the pieces for the second count on the balance and tap the [**M+**] function key.
- 7 Tap [**Result**].
 - ⇒ The result window is displayed.
If the result window consists of several screen pages, paging between the individual pages can take place with the two arrow keys.
- 8 Press [- 9 Tap [**OK**] to exit the result window.
- 10 Tap [**CL Result**] to end the counting series and delete the memory for the next series.
 - ⇒ A confirmation window is displayed.
- 11 To delete the statistics, confirm with [**OK**].
 - ⇒ The statistics are deleted.
 - ⇒ The function key is inactive and grayed.

Note

An error message is displayed if you tap the [**M+**] function key but no weight change has occurred. This prevents you from accidentally acquiring the same result twice.

If the automatic weight entry function is activated, the [**M+**] key does not need to be pressed for the result to be acquired. The value is automatically entered in the statistics.

If you have mistakenly saved an incorrect piece count result, you can use the [**CL Last**] function key to delete it. It is only available if values are already present in the memory; otherwise the key is grayed out and cannot be actuated. The key is deactivated after a result is deleted and is not activated again until the next result has been entered in the statistics.

10.2.3 Counting to a nominal value

The **Piececounting** application provides additional functions that simplify counting to a defined nominal value. You can use these functions for individual counts or for series counts with statistics. It is assumed that the reference for the piece count has already been determined.

Initial settings

To enter the nominal value and the associated tolerance range, activate the function keys listed below. Also activate the data fields with the same names so that the defined values will be displayed.



Nominal – Enable function keys.



+Tolerance



-Tolerance

We also recommend activating the **Abs/Diff** function key. This allows the results display to be switched at any time, between the amount already weighed and the remaining amount still to be weighed until the nominal value is reached.



Abs/Diff – Function key activation.

Procedure

Note

The function keys for entering the nominal value and the tolerance range are deactivated if values are already present in the statistics. In this case, you must clear the statistics with the **[CL Last]** function key before you can define the nominal value and the tolerance range.

The **[PCS]** unit is only available if a reference unit weight has already been determined.

► Function keys are activated.

► Statistics are deleted.

1 Tap the **[Nominal]** function key.

⇒ A numeric input window is displayed.

2 Enter the required value.

- If a weight corresponding to the nominal weight is already on the balance, it can be directly taken over by tapping the button with the balance icon.

Check the weighing unit to the right of the nominal weight.

A selection of available units, including **[PCS]** (pieces) can be displayed by tapping the weighing unit.

Note

Units are not converted automatically. When a value is entered in a unit, it is retained, even when the unit is changed.

3 Confirm with **[OK]** to activate the nominal weight.

4 Tap the **[+Tolerance]** and/or **[-Tolerance]** function key.

⇒ A numeric input window is displayed.

5 Enter the required value.

Both tolerances are set to 2.5% by default. Instead of a percentage, an absolute tolerance can be entered in any unit, e.g. **[PCS]**.

6 Confirm with **[OK]** to activate the tolerance.

Note

Piece counts outside the tolerance range are specifically marked with **>T+** or **<T-** when single values are recorded.

- ⇒ The **SmartTrac** graphic weighing-in aid with tolerance marks to facilitate weighing-in to the nominal weight is displayed.
- ⇒ Samples can be roughly weighed until the lower tolerance limit is reached and subsequent additions made up to the nominal weight.

10.2.4 Reference optimization

Reference optimization leads to more precise results for piece counting. With each reference optimization, the average piece weight (reference) is recalculated. Since the newly placed parts enlarge the basis for the calculation, the reference and the result of the piece count will be more precise.

Determine the reference with the desired method (fixed or variable reference unit quantity). Reference optimization can be carried out any number of times. The reference and the counting result will be more precise after each optimization.

Note

Reference optimization is only possible if:

- The number of placed parts is greater than the reference unit quantity.
- The number of placed parts is not greater than twice the last saved reference unit quantity.
- **Fixed reference unit quantity** or **variable reference unit quantity** are used as a method for determining the reference. Reference optimization is not possible when entering a known reference unit weight (function key [**PcsWgt**]).

In the case of a series of piece counts, reference optimization is only possible before the result of the first count is saved with the [**M+**] function key. The [**RefOpt**] function key is then grayed out and can no longer be pressed, since changing the calculation basis (Reference unit weight) is not permitted during an ongoing series.

The measured single value can be printed out with the [] key.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [].

To use reference optimization, activate the following function key.



RefOpt

– Activate function key.

- ▶ Function keys are activated.
 - ▶ Statistics are deleted.
- 1 Load the reference units on the weighing pan.
 - 2 Tap, e.g. [**FixPcs**].
 - ⇒ The measured average piece weight is saved as the reference.
 - 3 Place the pieces to be counted on the balance and tap the [**RefOpt**] function key.
 - ⇒ When the weight is stable (dashes disappear), the weighed quantity is used as the new reference quantity. The reference unit weight is recalculated on this basis.
 - ⇒ After reference optimization, the [**RefOpt**] function key remains inactive until further pieces are placed on the balance.
 - 4 Place further pieces on the balance, tap the [**RefOpt**] function key.
 - ⇒ The weighed quantity is used as the new reference quantity.
 - 5 Tap [**M+**] to enter the result in the statistics.
 - ⇒ The protocol header and the result (single value) of the current weighing are printed.
 - 6 Tap [**Result**].

- ⇒ The result window is displayed.
If the result window consists of several screen pages, paging between the individual pages can take place with the two arrow keys.
- 7 Press [] to print the result protocol.
- 8 Tap [**OK**] to exit the result window.
- 9 Tap [**CL Result**] to end the counting series and delete the memory for the next series.
 - ⇒ A confirmation window is displayed.
- 10 To delete the statistics, confirm with [**OK**].
 - ⇒ The statistics are deleted.
 - ⇒ The function key is inactive and grayed.

10.2.5 Example protocol of a piece count with statistical values

The detail of a protocol depends on the selected protocol settings. Only application-specific information is shown in the example printout.

Note

The values for **x**, **s**, **Min**, **Max**, **Diff**, and **Sum** are displayed in the current display unit; this does not necessarily have to be **PCS** (pieces).

Important information for the interpretation of recorded results

The **x** and **s** values are calculated results that are shown with higher resolution than the individual measured values. The significance of the last decimal place cannot be assured with a relatively small measurement series (fewer than 10 or so measured values) with small weight differences.

Example: Printout

```

---- Piececounting ----
25.Jul 2013      12:40
User Name       User 4
Balance Type    XPE204
WeighBridge SNR
                1234567890
Terminal SNR    1234567891
Nominal        110.00 PCS
+Tol           3 PCS
-Tol           1 PCS
Max n          3
  1            110 PCS
NetPcs         110 PCS
RefPcs         10 PCS
PcsWgt         2.314 g
  2            109 PCS
NetPcs         109 PCS
RefPcs         10 PCS
PcsWgt         2.314 g
  3>T          114 PCS
NetPcs         114 PCS
RefPcs         10 PCS
PcsWgt         2.314 g
n              3
x              111.000 PCS
s              2.600 PCS
s.rel          2.34 %
Min            109 PCS
Max            114 PCS
Diff           5 PCS
Sum            333.00 PCS
SumPcs         333 PCS
>T+            1
<T-            0

```

Signature

.....

11 Percent Weighing Application

Navigation:  > [Percentweighing]



This section provides information and descriptions of setting options for practical use of the application.

All application settings are saved under the active user profile. Each user can select specific settings for this application. It must be ensured that the required user profile is selected.

The **Percentweighing** application enables weighing to a predefined weight (100%) and identification of deviations from this nominal weight.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

Selecting the application

- 1 Press .
 - 2 Tap the [Percentweighing] icon in the selection window.
 - ⇒ The selected application is active.
 - ⇒ Some of the specific function keys and information fields for percent weighing are activated by default (factory defaults).
- ⇒ The balance is ready for weighing.

11.1 Settings for percent weighing application

Navigation:  > [Percentweighing] > 

Several specific settings are available for percent weighing. You can use them to adapt the application to your needs.

Most of the setting options are the same as for the **Weighing** application. Only the settings that differ are described below.

Unlike the **Weighing** application, only **one** custom unit can be specified. The **MinWeigh** feature is not available.

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Menu item	Explanation	Further information
Function Keys	Defines the function keys for percent weighing to appear at the bottom of the display. These keys enable direct access to specific functions.	See Specific function key for percent weighing (page 177)
Info Field	Defines the information fields to be displayed for percent weighing.	See Specific information fields for percent weighing (page 177)
Display Unit	Defines the unit for result display.	See Additional unit for percent weighing (page 178)
Info Unit	Defines an additional weighing unit. This is displayed in the respective information field.	See Additional unit for percent weighing (page 178)
Protocol	Selects information to be displayed in the weighing protocols.	See Specific protocol information for percent weighing (page 178)
Smart & ErgoSens	Programs both SmartSens sensors of the terminal. Up to two external ErgoSens (optional) can be assigned a function in this menu.	See Specific SmartSens and ErgoSens settings for percent weighing (page 180)

11.1.1 Specific function key for percent weighing

Navigation: [Menu] > [Percentweighing] > [Function Keys]

This menu item can be used to activate the following specific function keys for percent weighing.

All other function keys are the same as for the **Weighing** application.

The numbered function keys are displayed in the application at the bottom of the display. The numbers define the sequence in the display.

- Activate or deactivate function keys by tapping. The sequence of the keys is automatically updated.
 - To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.
- Application is activated.
- 1 Press [Function Keys].
 - ⇒ A window with application-dependent settings is displayed.
 - 2 Under **Function Keys**, tap the [Define] button.
 - 3 Select a function key by tapping.
 - ⇒ The function key is automatically numbered.
 - 4 Change the settings and confirm with [OK].
 - 5 To restore the factory default settings, tap [STD].
 - 6 To exit the menu item, tap [OK].

The arrow buttons can be used to page forward or back to a menu page.

	Designation	Explanation
	Set100%	Defines the current weight as a reference (100%).
	VarRef%	Assigns the current weight a variable reference.
	Nominal	Defines the desired nominal weight. This also serves as a reference for the tolerances.
	+Tol	Defines the accuracy (tolerances) for percent weighing.
	-Tol	Defines the accuracy (tolerances) for percent weighing.

Factory setting: [Set100%] and [VarRef%] activated in this sequence.

11.1.2 Specific information fields for percent weighing

Navigation: [Menu] > [Percentweighing] > [Info Field]

This menu item contains the following information fields for percent weighing.

All other data fields are the same as for the **Weighing** application.

The information fields in the display provide constant information on, e.g. set values, measured results.

- Information fields can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
 - To redefine the sequence, all information fields must be deactivated and then activated in the required sequence.
- Application is activated.
- 1 Press [Info Field].

- ⇒ A window with application-dependent settings is displayed.
- 2 Under **Info Field**, tap the [**Define**] button.
- 3 Select **Info Field** by tapping.
 - ⇒ The information field is automatically numbered.
- 4 Change the settings and confirm with [**OK**].
- 5 To restore the factory default settings, tap [**STD**].
- 6 To exit the menu item, tap [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Values	Explanation
Reference%	Displays the reference weight in percent.
Reference	Displays the absolute weight of the reference.
Nominal	This function key displays the nominal weight.
+Tol	This function key displays the entered tolerance for weighing-in to nominal weight.
-Tol	This function key displays the entered tolerance for weighing-in to nominal weight.

Factory setting: **Reference%** and **Reference** activated in this sequence.

11.1.3 Additional unit for percent weighing

Navigation: [Menu] > [**Percentweighing**] > [Unit] > **Display Unit** or **Info Unit**

The unit % (percent) is additionally displayed in the **Display Unit** and **Info Unit** menu items next to the known weighing units. This assumes that a reference has already been determined.

Note

The unit % does not need to be explicitly selected for percent weighing as the unit is always switched automatically to % when determining the reference. The required unit can subsequently be selected as required.

- 1 Press [Unit].
 - ⇒ A window with application-dependent settings opens.
- 2 Tap the button next to **Display Unit** or **Info Unit**.
 - ⇒ A selection window appears.
- 3 To change a setting, tap the corresponding button.
- 4 To exit the menu item, tap [**OK**].

Factory setting: g (Grams) for **Display Unit** and **Info Unit**.

11.1.4 Specific protocol information for percent weighing

Navigation: [Menu] > [**Percentweighing**] > [Unit] > **Protocol**

Here you define which data appears in the protocols. This large menu item is divided into three sub-menus. They enable you to make additional settings for the application. The rest of the available protocol data corresponds to the data for the **Weighing** application and is not described here.

The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.
- ▶ Application is activated.

- 1 Press [Unit].
 - ⇒ A window with application-dependent settings is displayed.

- 2 Under **Protocol**, tap the [**Define**] button.
 - ⇒ **Protocol** window is displayed.
- 3 Under (e.g. **Header**), tap the [**Define**] button.
- 4 Select an information key by tapping.
 - ⇒ The information key is automatically numbered.
- 5 To restore the factory default settings, tap [**STD**].
- 6 To exit the menu item, tap [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

Note

The results and data can be printed out at any time.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [].

The following parameters can be defined:

Menu item	Explanation	Further information
Header	Define the information to be printed in the protocol header (before the results).	See Protocol header
Single value	Define the information to be recorded for each single result.	See Recording single values
Footer	Define information to be printed in the protocol footer after the results (single values).	See Protocol footer

Header line of protocols

Use this sub-menu to define which data is printed in the protocol header (before the results).

The header is automatically printed if defined as part of the weighing protocol (in recording single values sub-menu).

However, the header can also be printed separately by tapping the [**Header**] function key.

The following parameters can be defined:

Values	Explanation
Ref%, Ref.	Records the reference in percent and weight.
Nom.,+Tol,-Tol	Records the defined nominal weight and determined plus/minus tolerances.

Factory setting: **Appl. Name** and **Date/Time** enabled in this order.

Recording of single values

Printing takes place by pressing the [] key or automatically if the automatic print function is activated.

The following parameters can be defined:

Values	Explanation
Ref%, Ref.	Records the reference in percent and weight.
Nom.,+Tol,-Tol	Records the defined nominal weight and determined plus/minus tolerances.
Diff.	Records the deviation from the nominal weight as a weight.
Diff. %	Records the deviation from the nominal weight in percent.

Factory setting: **Net** enabled.

Protocol footer

This sub-menu can be used to define the information to be printed in the protocol footer after the results (single values).

The footer can be printed by tapping the [**Footer**] function key.

The following parameters can be defined:

Values	Explanation
Ref%, Ref.	Records the reference in percent and weight.
Nom.,+Tol,-Tol	Records the defined nominal weight and determined plus/minus tolerances.

Factory setting: **Signature** and **3 Blank Lines** activated in this sequence.

11.1.5 Specific SmartSens and ErgoSens settings for percent weighing

Navigation:  > [Percentweighing] >  > **Smart & ErgoSens**

Additional settings for percent weighing are available for the SmartSens and ErgoSens sensors.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

When one of the functions is activated, the green **F** symbol (Function) lights up in the status bar below the respective sensor.

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **Smart & ErgoSens**, tap the [Define] button.
 - ⇒ A selection window is displayed.
- 3 Select the required menu item (e.g. **SmartSens left**).
 - ⇒ A selection window is displayed.
- 4 Select the function by tapping the button.
- 5 To exit the menu item, tap [OK].

Menu structure

Main menu	Submenu	Further information
SmartSens left	Off Door ->0<- ->T<- Print VarRef% Set100% ID1 ID2 ID3 ID4 Header Footer PreTare 1/2d 1/5d 1/10d 1/100d 1/1000d	See Parameter table
SmartSens right	Off Door ->0<- ->T<- Print VarRef% Set100% ID1 ID2 ID3 ID4 Header Footer PreTare 1/2d 1/5d 1/10d 1/100d 1/1000d	
ErgoSens 1 (Aux1)	Off Door ->0<- ->T<- Print VarRef% Set100% ID1 ID2 ID3 ID4 Header Footer PreTare 1/2d 1/5d 1/10d 1/100d 1/1000d AntiStatic Kit	
ErgoSens 2 (Aux2)	Off Door ->0<- ->T<- Print VarRef% Set100% ID1 ID2 ID3 ID4 Header Footer PreTare 1/2d 1/5d 1/10d 1/100d 1/1000d AntiStatic Kit	

The following parameters can be defined:

Values	Explanation
VarRef%	Emulates the function key with the same name. Assigns the current weight a variable reference.
Set100%	Emulates the function key with the same name. Defines the current weight as a reference (100%).

Factory setting: SmartSens left and right configured for door operation (draft shield). Both ErgoSens deactivated, [Off].

11.2 Working with the percent weighing application

Navigation:  > [Percentweighing]

This section describes working with the **Percentweighing** application. Among other things, you can determine a tare weight, change the resolution of the weighing result or work with identifiers.

You are probably already familiar with these options from the **Weighing** application. They are therefore not described again here.

11.2.1 Simple percent weighing

Initial settings

To perform a percent weighing, the two following function keys must be activated.



VarRef%

– Activate function keys.



Set100%

Determining the reference

Place the reference weight on the weighing pan. If the applied reference weight is to correspond to 100%, press the [Set100%] function key. When the weighing result is stable, the determined weight is taken over as a reference. The reference weight (100%) is shown in the result display and information field **Reference%**. The absolute reference weight is displayed in the **Reference** information field.

If the applied weight is assigned a variable reference, press the [VarRef%] function key. Displayed is an input field in which the percentage (e.g. 60%) is defined corresponding to the applied weight.

Performing a percent weighing

The measured single value can be printed out with the  key.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

Note

If the weight of the product is to be displayed instead of the percentage, tap the unit [%]. Tap the required weighing unit from the selection window.

- ▶ Function keys are activated.
- 1 Place the reference weight on the weighing pan.
 - 2 Tap [Set100%].
 - ⇒ When the result is stable (horizontal lines disappear), the determined weight is taken as a reference.
 - ⇒ The reference weight (100%) is shown in the result display and information field **Reference%**.
 - ⇒ The absolute reference weight is displayed in the **Reference** information field.
 - 3 Place the product on the balance.
 - 4 Press  to print the percent weighing result.
 - 5 Tap [Footer] to print the footer.
- ⇒ Percent weighing is complete.

11.2.2 Percent weighing to a nominal weight

The **Percent** application offers additional functions to facilitate weighing to a defined nominal weight. It is assumed that the reference for percent weighing has already been determined.

Initial settings

To enter the nominal value and the associated tolerance range, activate the function keys listed below. Also activate the data fields with the same names so that the defined values will be displayed.



Nominal – Enable function keys.



+Tolerance



-Tolerance

Procedure

Note

Units are not converted automatically. If a value is entered in a unit, this value is maintained even if the unit is changed.

► Function keys are activated.

1 Tap [**Nominal**].

⇒ A numeric input window is displayed.

2 Enter the required value, e.g. 130%.

- If a weight corresponding to the nominal weight is already on the balance, it can be directly taken over by tapping the button with the balance icon.

Check the weighing unit to the right of the nominal weight.

A selection of available units, including [%] (percent) can be displayed by tapping the weighing unit.

Note

The unit [%] is only available after the reference has been determined.

3 Confirm with [**OK**] to activate the nominal weight.

4 Tap [**+Tolerance**] and/or [**-Tolerance**]

⇒ A numeric input window is displayed.

5 Enter the required value.

Both tolerances are set to 2.5% by default. Instead of a percentage, an absolute tolerance can also be entered in any unit, e.g. [%].

6 Confirm with [**OK**] to activate the tolerance.

Note

Percent weighings outside the tolerances are specifically marked with >T+ or <T- when recording single values.

⇒ The **SmartTrac** graphic weighing-in aid with tolerance marks to facilitate weighing-in to the nominal weight is displayed.

⇒ Products can be roughly weighed until the tolerance is reached and subsequently finely dosed up to the nominal weight.

11.2.3 Sample protocol of a percent weighing

The detail of a protocol depends on the selected protocol settings. Only application-specific information is shown in the example printout.

Example: Printout

```
---- Percentweighing ---  
25.Jul 2013      13:51  
User Name      User 5  
Reference%    100.00 %  
Reference      27.05 g  
Nominal        130 %  
+Tol          2.50 %  
-Tol          2.50 %  
              129.06 %  
Diff.%        -0.94 %  
  
Signature  
.....
```

12 Density Application

Navigation:  > [Density]



This section contains information and setting options for practical working with the application.

All application settings are saved under the active user profile. Each user can select specific settings for this application. It must be ensured that the required user profile is selected.

The **Density** application is used for determining the density of solids and liquids as well as pasty substances. Each sample can be assigned an identification and the integrated statistics function can be used for statistical evaluation of measurements. Density determination is carried out based on **Archimedes' principle** according to which a body immersed in a fluid undergoes an apparent loss in weight which is equal to the weight of the fluid it displaces.

The hanger opening in the balance can be used for density determination. The optional density kit should be used for determining the density of solids. This includes all necessary accessories and aids for convenient and precise density determination. The density kit is supplied with separate instructions with a description of installation and use. A sinker is additionally required for determining the density of liquids and is available from a METTLER TOLEDO representative.

Alternatively, the **Density** application can also be used for determining the density of liquids using a pycnometer. Pycnometers are available from companies specializing in lab supplies.

A gamma sphere is required for determining the density of pasty substances. The names of suppliers can be obtained from an authorized representative.

Note

Refer to the separate instructions supplied with the accessories. These contain useful information for working with these aids and their maintenance and use.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

Selecting the application

- 1 Tap .
 - 2 Tap the [Density] icon in the selection window.
 - ⇒ The selected application is active.
 - ⇒ Some of the specific function keys and information fields for density determination are activated by default (factory defaults).
- ⇒ The balance is ready for determining the density of solids using the auxiliary liquid, water.

12.1 Density application settings

Navigation:  > [Density] > 

Various specific settings are available for density determination which can be used for adapting applications to suit specific requirements.

Most of the setting options are the same as for the **Weighing** application. Only the settings that differ are described below.

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Menu item	Explanation	Further information
Method	Defines the density determination method.	See Selecting the density determination method (page 185)
Aux. Liquid	Defines the auxiliary liquid.	See Selecting an auxiliary liquid (page 185)

Statistics	Activates/deactivates the statistics for the selected method.	See Activation or deactivation of statistics (page 185)
Result Output Format	Defines how the result of the density determination is calculated and displayed.	see Specifications for calculation and result display (page 186)
Function Keys	Defines the function keys for density determination to appear at the bottom of the display.	See Specific function keys for density determination (page 186)
Info Field	Defines the information fields displayed for density determination.	See Specific information fields for density determination (page 187)
Protocol	Selects information to be shown in the weighing protocols.	See Specific protocol information for density determination (page 188)
Smart & ErgoSens	Programs both terminal SmartSens sensors. Up to two external ErgoSens (optional) can be assigned a function in this menu.	See Specific SmartSens and ErgoSens settings for density determination (page 190)

12.1.1 Selecting the density determination method

Navigation:  > [Density] >  > Method

This menu item can be used to define the density determination method.

The following parameters can be defined:

Menu item	Explanation	Further information
Solid	Determines the density of non-porous solids using an auxiliary liquid.	See
Aux. Liquid	Determines the density of liquids using a sinker.	See
Pasty Subst.	Determines the density of pasty substances using a gamma sphere.	See
Pycnometer	Determines the density of liquids using a pycnometer.	See
Solid porous	Determines the density of porous solids using an additional oil bath.	See

Factory setting: [Solid] activated.

12.1.2 Selecting an auxiliary liquid

Navigation:  > [Density] >  > Aux. Liquid

This menu item can be used to define an auxiliary liquid. This setting is only used for determining the density of solids.

The following parameters can be defined:

Values	Explanation
Water	The density of distilled water at temperatures from 10.0°C to 30.0°C is stored in the balance.
Ethanol	The density of ethanol at temperatures from 10.0°C to 30.0°C is stored in the balance.
Others	Any auxiliary liquid whose density at the current temperature must be known.

Factory setting: [Water] activated.

12.1.3 Activation or deactivation of statistics

Navigation:  > [Density] >  > Statistics

The balance can store specific statistics for each density determination method. When the statistics function is activated, a request is made at the end of each density determination to include the result in the statistics. This menu item can be used to activate or deactivate the statistics function.

Note

To use the statistics, activate both [**Start**] and [**Temp.AL**] function keys.

The following parameters can be defined:

Values	Explanation
On	Activates the statistics function.
Off	Deactivates the statistics function.

Factory setting: [**Off**].

12.1.4 Specifications for calculation and result display

Navigation:  > [**Density**] >  > **Result Output Format**

This menu item can be used to define the number of decimal places and unit used for calculation and display of the density determination result and also whether the air buoyancy is to be taken into account in calculation.

The following parameters can be defined:

Parameters	Explanation	Values
No. of decimal-points	Defines the number of decimal places. The density determination result can be displayed and recorded with 1 to 5 decimal places.	1 2 3* 4 5
Compensation	Defines the correction factor for force calibration. With = the density determination result can be corrected by the force calibration correction factor and mean air density. Without = no correction takes place. With/Without = the corrected and uncorrected result is displayed and recorded.	With* Without With/Without
Density Unit	Defines the unit to be used for density determination. g/cm³ = grams per cm ³ . kg/m³ = kilograms per mkg/m ³ . g/l = grams per liter.	g/cm³* kg/m³ g/l

* Factory setting

12.1.5 Specific function keys for density determination

Navigation:  > [**Density**] >  > **Function Keys**

This menu item can be used to activate the following specific function keys for density determination.

All other function keys are the same as for the **Weighing** application.

The numbered function keys are displayed in the application at the bottom of the display. The numbers define the sequence in the display.

- Activate or deactivate function keys by tapping. The sequence of the keys is automatically updated.
 - To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.
- Application is activated.
- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
 - 2 Under **Function Keys**, tap the [**Define**] button.
 - 3 Select a function key by tapping.
 - ⇒ The function key is automatically numbered.

- 4 Change the settings and confirm with [OK].
- 5 To restore the factory default settings, tap [STD].
- 6 To exit the menu item, tap [OK].

The arrow buttons can be used to page forward or back to a menu page.

	Designation	Explanation
	Start	Starts density determination.
	Density AL	Defines the density of the auxiliary liquid. Only required for determining the density of solids and if an auxiliary liquid other than water or ethanol is used.
	Temp.AL	Entry of the auxiliary liquid temperature. Only required if distilled water or ethanol is used. For other liquids, the density at the current temperature must always be entered. For methods that do not require the use of an auxiliary liquid, the key for entering the current ambient temperature can be used. This is shown in the protocols.
	Vol.Sinker	Entry of the sinker volume (in cm ³ , max. 5 decimal places). Only required for determining the density of liquids using a sinker.
	Vol.G. Sphere	Entry of the gamma sphere volume (in cm ³ , max. 5 decimal places). Only required for determining the density of pasty substances using a gamma sphere.
	Vol.Pycno	Entry of the pycnometer volume (in cm ³ , max. 5 decimal places). Only required for determining the density of liquids using a pycnometer.
	Wgt. Pycno	Entry of the pycnometer weight. Only required for determining the density of liquids using a pycnometer.
	Result	Displays the statistics for the current density determination method. Note This function key only needs to be activated if the statistics function is also activated. If no results are available in the statistics, the key is inactive and cannot be actuated.
	CL Result	Clears the statistics for the current density determination to start a new series of measurements.

Factory setting: [Start] and [Temp.AL] activated in this sequence.

12.1.6 Specific information fields for density determination

Navigation:  > [Density] >  > Info Field

This menu item provides the following information fields for density determination.

All other data fields are the same as for the **Weighing** application.

The information fields in the display provide constant information on, e.g. set values, measured results.

- Information fields can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
 - To redefine the sequence, all information fields must be deactivated and then activated in the required sequence.
- Application is activated.
- 1 Press [].
⇒ A window with application-dependent settings is displayed.
 - 2 Under **Info Field**, tap the [**Define**] button.
 - 3 Select **Info Field** by tapping.
⇒ The information field is automatically numbered.
 - 4 Change the settings and confirm with [**OK**].
 - 5 To restore the factory default settings, tap [**STD**].
 - 6 To exit the menu item, tap [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Values	Explanation
Method	Shows the selected density determination method.
Aux. Liquid	Displays the selected auxiliary liquid (determination of the density of solids).
Temp.AL	Displays the temperature of the auxiliary liquid (distilled water, ethanol) entered via the function key with the same name.
Density AL	Displays the density of the auxiliary liquid. For water or ethanol, is automatically selected from the integrated density tables and displayed. For other auxiliary liquids, the density entered via the function key with the same name is displayed.
Vol.Sinker	Displays the sinker volume (determination of the density of liquids using a sinker).
Vol.Gamma	Displays the gamma sphere volume (determination of the density of pasty substances using a gamma sphere).
Vol.Pycno	Displays the pycnometer volume (determination of the density of liquids using a pycnometer).
Wgt. Pycno	Displays the pycnometer weight (determination of the density of liquids using a pycnometer).

Factory setting: [**Method**], [**Aux. Liquid**] and [**Temp.AL**] activated in this sequence.

12.1.7 Specific protocol information for density determination

Navigation: [] > [**Density**] > [] > **Protocol**

Here you define which data appears in the protocols. This large menu item is divided into three sub-menus. They enable you to make additional settings for the application. The rest of the available protocol data corresponds to the data for the **Weighing** application and is not described here.

The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
 - To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.
- Application is activated.
- 1 Press [].
⇒ A window with application-dependent settings is displayed.

- 2 Under **Protocol**, tap the [**Define**] button.
⇒ **Protocol** window is displayed.
- 3 Under (e.g. **Header**), tap the [**Define**] button.
- 4 Select an information key by tapping.
⇒ The information key is automatically numbered.
- 5 To restore the factory default settings, tap [**STD**].
- 6 To exit the menu item, tap [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

Note

The results and data can be printed out at any time.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [].

The following parameters can be defined:

Menu item	Explanation	Further information
Header	Define the information to be printed in the protocol header (before the results).	See Protocol header
Single value	Define the information to be recorded for each single result.	See Recording single values
Statistics	Define the statistics to be recorded.	See Section Recording statistics

Header line of protocols

Use this sub-menu to define which data is printed in the protocol header (before the results).

The header is printed automatically when a single value protocol is output.

The following parameters can be defined:

Values	Explanation
Method	Records the selected density determination method.
Aux. Liquid	Records the selected auxiliary liquid (determination of the density of solids).
Density AL	Records the density of the auxiliary liquid. Entry via the function key with the same name. For water or ethanol, the value selected from the integrated table is recorded.
Temp.AL	Records the temperature of the auxiliary liquid (for water and ethanol) entered via the function key with the same name.
Vol.Sinker	Records the sinker volume (determination of the density of liquids using a sinker) entered via the function key with the same name.
Vol.Gamma	Records the gamma sphere volume (determination of the density of pasty substances using a gamma sphere) entered via the function key with the same name.
Vol.Pycno	Records the pycnometer volume (determination of the density of liquids using a pycnometer) entered via the function key with the same name.
Wgt. Pycno	Records the pycnometer weight (determination of the density of liquids using a pycnometer) entered via the function key with the same name.

Factory setting: Appl. Name activated.

Recording of single values

Press [] to print a single value protocol (protocol of a single density determination).

The following parameters can be defined:

Values	Explanation
Method	Records the selected density determination method.
Aux. Liquid	Records the selected auxiliary liquid (determination of the density of solids).

Density AL	Records the density of the auxiliary liquid. Entry via the function key with the same name. For water or ethanol, the value selected from the integrated table is recorded.
Temp.AL	Records the temperature of the auxiliary liquid (for water and ethanol) entered via the function key with the same name.
Vol.Sinker	Records the sinker volume (determination of the density of liquids using a sinker) entered via the function key with the same name.
Vol.Gamma	Records the gamma sphere volume (determination of the density of pasty substances using a gamma sphere) entered via the function key with the same name.
Vol.Pycno	Records the pycnometer volume (determination of the density of liquids using a pycnometer) entered via the function key with the same name.
Wgt. Pycno	Records the pycnometer weight (determination of the density of liquids using a pycnometer) entered via the function key with the same name.
Wgt. in Air	Records the weight of the sample in air (determination of the density of solids).
Wgt. in Liquid	Records the weight of the sample in the auxiliary liquid (determination of the density of solids) or the weight of the sample substance displaced by the sinker or gamma sphere.
Wgt. of content	Records the weight of the sample in the pycnometer (determination of the density of liquids using a pycnometer).
Vol.Probe	Records the volume of the sample (calculated by the firmware).
Density	Records the result of the current density determination.

Factory setting: Density and 3 Blank Lines activated in this sequence.

Recording statistics

Press  to print a statistics protocol. Takes place when the statistics window is open.

The following parameters can be defined:

Values	Explanation
Method	Records the selected density determination method.
Aux. Liquid	Records the selected auxiliary liquid (determination of the density of solids).
n, x, s, s. rel	<p>n = records the number of samples in the current series of measurements.</p> <p>x = records the average density of all samples.</p> <p>s = records the absolute standard deviation within the current series of measurements.</p> <p>s.rel = records the relative standard deviation within the current series of measurements.</p>
Min,Max,Diff	Min = records the lowest determined density within a series of measurements.
	Max = records the highest determined density within a series of measurements.
	Diff. = records the difference between the highest and lowest density within a series of measurements.

Factory setting: n, x, s, s. rel, Min,Max,Diff, Signature, Dash Line and 3 Blank Lines activated in this sequence.

12.1.8 Specific SmartSens and ErgoSens settings for density determination

Navigation:  > [Density] >  > **Smart & ErgoSens**

Additional density determination settings are available for SmartSens and ErgoSens sensors.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

When one of the functions is activated, the green **F** symbol (Function) lights up in the status bar below the respective sensor.

1 Press .

- ⇒ A window with application-dependent settings is displayed.
- 2 Under **Smart & ErgoSens**, tap the **[Define]** button.
 - ⇒ A selection window is displayed.
- 3 Select the required menu item (e.g. **SmartSens left**).
 - ⇒ A selection window is displayed.
- 4 Select the function by tapping the button.
- 5 To exit the menu item, tap **[OK]**.

Menu structure

Main menu	Submenu	Further information
SmartSens left	Off Door Print Start Result OK ID1 ID2 ID3 ID4 1/2d 1/5d 1/10d 1/100d 1/1000d	See Parameter table
SmartSens right	Off Door Print Start Result OK ID1 ID2 ID3 ID4 1/2d 1/5d 1/10d 1/100d 1/1000d	
ErgoSens 1 (Aux1)	Off Door Print Start Result OK ID1 ID2 ID3 ID4 1/2d 1/5d 1/10d 1/100d 1/1000d AntiStatic Kit	
ErgoSens 2 (Aux2)	Off Door Print Start Result OK ID1 ID2 ID3 ID4 1/2d 1/5d 1/10d 1/100d 1/1000d AntiStatic Kit	

The following parameters can be defined:

Values	Explanation
Start	Emulates the function key with the same name. Starts density determination.
Result	Emulates the function key with the same name. Opens the result window.
OK	Emulates pressing of the button with the same name in the formulation dialog (however not in the menus) for confirmation of entries and actions.

Factory setting: SmartSens left and right configured for door operation (draft shield). Both ErgoSens deactivated, **[Off]**.

12.2 Working with the density application

Navigation:  > **[Density]**

This section describes working with the **Density** application and the different density determination methods.

12.2.1 Determination of the density of non-porous solids

Navigation:  > **[Density]** >  > **Method** > **[Solid]**

For the determination of the density of non-porous solids, the solid is first weighed in air and then in the auxiliary liquid. The difference in weight results in the buoyancy from which the density is calculated by the firmware.

Note

- The hanger opening for weighing below the balance can be used for this purpose.
- When working with the optional density kit, observe the information in the supplied instructions.

Select in the application-specific settings as **Method [Solid]**. Define the required auxiliary liquid, e.g. **[Water]**.

If an auxiliary liquid other than water or ethanol is used, activate the **[Density AL]** function key and the information field with the same name. Enter the density of the auxiliary liquid at the current temperature by pressing the

[**Density AL**] function key (in g/cm^3 , max. 5 decimal places). This is required as density tables are stored in the balance only for water and ethanol. The entered value is displayed in the information field with the same name. The activated [**Temp.AL**] function key and information with the same name are not required for density determination with an auxiliary liquid other than water and ethanol. This function key can be used to enter the current ambient temperature. This is subsequently also printed on the protocols and shows the temperature at which the density was determined.

Activate the appropriate function keys and information fields.



Start – Activate function keys.



Temp.AL



Density AL

The result of the density determination can be printed with the [≡] key. The result is stored up to completion of the next density determination with the same method and can be printed again as required.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
 - To print out the settings, press [≡].
 - ▶ Function keys are activated.
- 1 Tap [☰].
 - ⇒ A window with application-dependent settings is displayed.
 - 2 Under **Method**, tap the associated button.
 - ⇒ A selection window with methods is displayed.
 - 3 Tap [**Solid**].
 - 4 Under **Aux. Liquid**, tap the associated button.
 - ⇒ A selection window is displayed.
 - 5 Tap, e.g. [**Water**].
 - 6 Tap [**Temp.AL**].
 - ⇒ A numeric input window is displayed.
 - 7 Enter the value (10°C to 30°C) and confirm with [**OK**].
For water and ethanol, density tables for the temperature range 10°C to 30°C are stored in the balance.
 - 8 Tap [**Start**].
 - ⇒ The balance is automatically tared.
 - ⇒ The balance requests that the solid is weighed in air.
 - 9 Place the solid on the balance.
When working with the optional density kit, observe the information in the supplied instructions.
When working with the hanger opening, hang the solid on the hanging device.
 - ⇒ The weight of the solid is displayed at the bottom left corner of the window.
 - 10 Tap [**OK**] to enter the weight.
 - ⇒ The weighing result is stored.
 - ⇒ The balance requests that the solid is weighed in the auxiliary liquid.
 - 11 Place the solid on the balance.
The solid must be immersed at least 1 cm in the liquid and no air bubbles must be present in the container.
When working with the hanger opening, the container with the auxiliary liquid must be placed below the hanging device.
 - 12 Tap [**OK**] to enter the weight.

- ⇒ The balance determines the density of the solid.
- ⇒ The result window with compensated and/or uncompensated value is displayed.

13 To exit the menu item, tap **[OK]**.

- ⇒ Density determination is complete.

12.2.2 Determination of the density of liquids using a sinker

Navigation:  > **[Density]** >  > **Method** > **[Liquid]**

For the determination of the density of liquids, a sinker with a known volume is used. The sinker is initially tared in air and then weighed in the liquid whose density is to be determined. The difference in weight results in the buoyancy from which the density is calculated by the firmware.

Note

- The hanger opening for weighing below the balance can be used for this purpose.
- When working with the optional density kit, observe the information in the supplied instructions.

Select in the application-specific settings as **Method [Liquid]**.

The activated **[Temp.AL]** function key and information field with the same name are not required for this density determination method. This function key can be used to enter the current ambient temperature. This is subsequently printed together with the protocols showing the temperature at which the density was determined.

Activate the appropriate function keys and information fields.



Start – Activate function keys.



Vol.Sinker



Temp.AL

The result of the density determination can be printed with the  key. The result is stored up to completion of the next density determination with the same method and can be printed again as required.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .
- ▶ Function keys are activated.

1 Tap .

- ⇒ A window with application-dependent settings is displayed.

2 Under **Method**, tap the associated button.

- ⇒ A selection window with methods is displayed.

3 Tap **[Liquid]**.

4 Tap **[Vol.Sinker]**.

- ⇒ A numeric input window is displayed.

5 Enter the sinker volume, e.g. 10.00000 cm³ and confirm with **[OK]**.

6 Tap **[Start]**.

- ⇒ The balance requests that the sinker is weighed in air.

7 Place the sinker on the balance and confirm with **[OK]**.

- When working with the optional density kit, observe the information in the supplied instructions.
- When working with the hanger opening, hang the sinker on the hanging device.

- ⇒ The balance is automatically tared.

- ⇒ The balance requests that the sinker is weighed in the liquid.
- 8 Pour the liquid into the beaker.
The sinker must be immersed at least 1 cm in the liquid and no air bubbles must be present in the container.
When working with the hanger opening, place the container with the liquid below the hanging device.
⇒ The buoyancy of the sinker is displayed with a negative sign at the bottom left corner of the window.
- 9 Tap **[OK]** to enter the weight.
⇒ The weighing result is stored.
⇒ The balance requests that the solid is weighed in the auxiliary liquid.
- 10 Place the solid on the balance.
The sinker must be immersed at least 1 cm in the liquid and no air bubbles must be present in the container.
When working with the hanger opening, place the container with the liquid below the hanging device.
- 11 Tap **[OK]** to enter the weight.
⇒ The balance determines the density of the liquid.
⇒ The result window with compensated and/or uncompensated value is displayed.
- 12 To exit the menu item, tap **[OK]**.
⇒ Density determination is complete.

12.2.3 Determination of the density of pasty substances using a gamma sphere

Navigation:  > **[Density]** >  > **Method** > **[Pasty Subst.]**

For the determination of the density of pasty substances, a gamma sphere with a known volume is normally used. The pasty substance is initially tared without gamma sphere and then weighed with gamma sphere.

Select in the application-specific settings as **Method [Pasty Subst.]**.

The activated **[Temp.AL]** function key and information field with the same name are not required for this density determination method. This function key can be used to enter the current ambient temperature. This is subsequently printed together with the protocols showing the temperature at which the density was determined.

Activate the appropriate function keys and information fields.



Start

– Activate function keys.



Vol.Gamma



Temp.AL

The result of the density determination can be printed with the  key. The result is stored up to completion of the next density determination with the same method and can be printed again as required.

▶ A printer is connected and activated as an output device in the peripheral device settings.

– To print out the settings, press .

▶ Function keys are activated.

1 Tap .

⇒ A window with application-dependent settings is displayed.

2 Under **Method**, tap the associated button.

⇒ A selection window with methods is displayed.

3 Tap **[Pasty Subst.]**.

- 4 Tap [**Vol.Gamma**].
 - ⇒ A numeric input window is displayed.
- 5 Enter the gamma sphere volume, e.g. 10.00000 cm³ and confirm with [**OK**].
- 6 Tap [**Start**].
 - ⇒ The balance requests that the sample is weighed.
- 7 Place the sample on the balance (without gamma sphere) and confirm with [**OK**].
 - ⇒ The balance is automatically tared.
 - ⇒ The sample weight is displayed at the bottom left corner of the window.
 - ⇒ The balance requests that the gamma sphere is immersed in the liquid.
- 8 Immerse the gamma sphere in the liquid.
 - ⇒ The weight of the substance displaced by the gamma sphere is displayed at the bottom left corner of the window.
- 9 Tap [**OK**] to enter the weight.
 - ⇒ The weight is stored.
 - ⇒ The balance determines the density of the pasty substance.
 - ⇒ The result window with compensated and/or uncompensated value is displayed.
- 10 To exit the menu item, tap [**OK**].
 - ⇒ Density determination is complete.

12.2.4 Determination of the density of liquids using a pycnometer

Navigation: [] > [**Density**] > [] > **Method** > [**Pycnometer**]

For the determination of the density of liquids, a pycnometer is frequently used, i.e. a glass beaker with a known volume and weight. The liquid is filled into the pycnometer and weighed.

Select in the application-specific settings as **Method [Pycnometer]**.

The activated [**Temp.AL**] function key and information field with the same name are not required for this density determination method. This function key can be used to enter the current ambient temperature. This is subsequently printed together with the protocols showing the temperature at which the density was determined.

Activate the appropriate function keys and information fields.



Start – Activate function keys.



Wgt. Pycno



Vol. Pycno



Temp.AL

The result of the density determination can be printed with the [] key. The result is stored up to completion of the next density determination with the same method and can be printed again as required.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [].
- ▶ Function keys are activated.

- 1 Tap [].
 - ⇒ A window with application-dependent settings is displayed.

- 2 Under **Method**, tap the associated button.
⇒ A selection window with methods is displayed.
- 3 Tap [**Pycnometer**].
- 4 Tap [**Wgt. Pycno**].
⇒ A numeric input window is displayed.
- 5 Enter the pycnometer weight, e.g. 43.83 g and confirm with [**OK**].
- 6 Tap [**Vol.Pycno**].
⇒ A numeric input window is displayed.
- 7 Enter the pycnometer volume, e.g. 50.331 cm³ and confirm with [**OK**].
- 8 Tap [**Start**].
⇒ The balance requests that the filled pycnometer is placed on the balance.
⇒ The pycnometer weight is displayed with a negative sign at the bottom left corner of the window.
- 9 Place the filled pycnometer on the balance and confirm with [**OK**].
⇒ The net weight of the sample is displayed at the bottom left corner of the window.
- 10 Tap [**OK**] to enter the weight.
⇒ The weight is stored.
⇒ The balance determines the density of the liquid.
⇒ The result window with compensated and/or uncompensated value is displayed.
- 11 To exit the menu item, tap [**OK**].
⇒ Density determination is complete.

12.2.5 Determination of the density of porous solids

Navigation:  > [**Density**] >  > **Method** > [**Solid porous**]

For the determination of the density of porous solids, the solid is initially weighed in air. In contrast to non-porous solids, an additional oil bath is required to close the pores in the solid before being weighed in the auxiliary liquid.

Note

- The hanger opening for weighing below the balance can be used for this purpose.
- When working with the optional density kit, observe the information in the supplied instructions.

Select in the application-specific settings as **Method** [**Solid porous**]. Define the required auxiliary liquid, e.g. [**Water**].

If an auxiliary liquid other than water or ethanol is used, activate the [**Density AL**] function key and the information field with the same name. Enter the density of the auxiliary liquid at the current temperature by pressing the [**Density AL**] function key (in **g/cm³**, max. 5 decimal places). This is required as density tables are stored in the balance only for water and ethanol. The entered value is displayed in the information field with the same name. The activated [**Temp.AL**] function key and information with the same name are not required for density determination with an auxiliary liquid other than water and ethanol. This function key can be used to enter the current ambient temperature. This is subsequently also printed on the protocols and shows the temperature at which the density was determined.

Activate the appropriate function keys and information fields.



Start – Activate function keys.



Temp.AL



Density AL

The result of the density determination can be printed with the  key. The result is stored up to completion of the next density determination with the same method and can be printed again as required.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .
- ▶ Function keys are activated.
- 1 Tap .
- ⇒ A window with application-dependent settings is displayed.
- 2 Under **Method**, tap the associated button.
- ⇒ A selection window with methods is displayed.
- 3 Tap [**Solid**].
- 4 Under **Aux. Liquid**, tap the associated button.
- ⇒ A selection window is displayed.
- 5 Tap, e.g. [**Water**].
- 6 Tap [**Temp.AL**].
- ⇒ A numeric input window is displayed.
- 7 Enter the value (10°C to 30°C) and confirm with [**OK**].
For water and ethanol, density tables for the temperature range 10°C to 30°C are stored in the balance.
- 8 Tap [**Start**].
- ⇒ The balance is automatically tared.
- ⇒ The balance requests that the solid is weighed in air.
- 9 Place the solid on the balance.
When working with the optional density kit, observe the information in the supplied instructions.
When working with the hanger opening, hang the solid on the hanging device.
- ⇒ The weight of the solid is displayed at the bottom left corner of the window.
- 10 Tap [**OK**] to enter the weight.
- ⇒ The weight is stored.
- ⇒ The balance requests that the solid is briefly immersed in the oil bath and placed on the balance again.
- 11 Immerse the solid in the oil bath.
- 12 Place the solid in the same position again.
- ⇒ The weight of the solid is displayed at the bottom left corner of the window.
- 13 Tap [**OK**] to enter the weight.
- ⇒ The weight is stored.
- ⇒ The balance requests that the solid wetted with oil is immersed in the auxiliary liquid.
The solid must be immersed at least 1 cm in the liquid and no air bubbles must be present in the container.
When working with the hanger opening, the container with the auxiliary liquid must be placed below the hanging device.
- ⇒ The weight of the solid is displayed at the bottom left corner of the window.

14 Tap **[OK]** to enter the weight.

⇒ The balance determines the density of the solid.

⇒ The result window with compensated and/or uncompensated value is displayed.

15 To exit the menu item, tap **[OK]**.

⇒ Density determination is complete.

12.2.6 Example protocol of a density determination

The detail of a protocol depends on the selected protocol settings. Only application-specific information is shown in the example printout.

The result protocol can be printed by pressing the  key with the result window.

Note

The result remains stored up to completion of the next density determination. The result can be printed again by pressing the  key. This may be necessary if a second copy of a protocol is required or if the printer could not be used due to a lack of paper.

Example: Printout

```
----- Dichte -----  
25.Jul 2013          14:51  
User Name          User 6  
  
Method              Solid  
Liquid              Water  
Density AL  
                   0.99800 g/cm3  
Temperature         21.2 °C  
Wgt. in Air         21.78 g  
Wgt. in Liquid  
                   16.90 g  
Density             4.447 g/cm3  
                   =====  
Density uncomp.  
                   4.451 g/cm3  
                   =====  
  
Signature  
.....
```

12.3 Using density statistics

Statistics can be provided for each density determination method. Stored are all results (max. 651500) recorded in the statistics during density determination.

Initial settings

The statistics can be used by activating the statistics function and the following function keys.

See Activation or deactivation of statistics (page 185).

Note

If there are no values in the statistics, the **[Result]** and **[CL Result]** function keys are inactive and cannot be actuated.



Result – Activate function keys.



CL Result

Entry of values for statistics

If the statistics function is activated, a request is made at the end of each density determination to enter the results in the statistics.

- ▶ The statistics function is activated.
- Tap **[Yes]**.
 - ⇒ The results are entered in the statistics of the current method.
 - ⇒ Copying of the results is confirmed on the display.

If the results are not to be entered in the statistics, press **[No]**. The results are retained until the next measurement, but are not copied to the statistics.

Statistics display and printing

The density determination method must be selected in order to display or print the associated statistics.

See Selecting the density determination method (page 185).

Displayed in the statistics window are the values selected for recording statistics. The statistics protocol can be printed by pressing the  key with the statistics window open.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

Example: Printout

```

----- Dichte -----
25.Jul 2013          14:55
User Name           User 6

Method              Solid
Liquid              Water
With Compensation
n                   5
x                   5.5004 g/cm3
s                   0.0942 g/cm3
s.rel               1.71 %
Without Compensation
n                   5
x                   5.5062 g/cm3
s                   0.0944 g/cm3
s.rel               1.72 %
With Compensation
Min                 5.423 g/cm3
Max                 5.603 g/cm3
Diff.               0.180 g/cm3
Without Compensation
Min                 5.429 g/cm3
Max                 5.609 g/cm3
Diff.               0.180 g/cm3

Signature
.....

```

- ▶ Function keys are activated.
 - ▶ The density determination method is selected.
 - ▶ Values are present in the statistics.
- 1 Tap [**Result**].
 - ⇒ The statistics window with compensated and/or uncompensated values is displayed.
 - ⇒ Only displayed are the values selected for recording statistics.
 - 2 Tap [].
 - ⇒ The statistics protocol is printed.
 - 3 To exit the menu item, tap [**OK**].

Deleting statistics

To end a series of measurements, press the [**CL Result**] function key. This clears the associated statistics. For security reasons, a request is displayed, which must be confirmed before the statistics are cleared.

Note

The [**CL Result**] function key clears the statistics of the currently selected density determination method. The statistics of other methods are retained. Prior to clearing, it must be ensured that the density determination method, the statistics of which are to be cleared, is selected.

- ▶ Function keys are activated.
 - ▶ The density determination method is selected.
 - ▶ Values are present in the statistics.
- 1 Tap [**CL Result**].
 - ⇒ A confirmation window is displayed.
 - 2 To clear the statistics, tap [**Yes**].
 - ⇒ The statistics are cleared.
- ⇒ The function key is inactive and grayed.

12.4 Formulae used to calculate density

The **Density** application is based on the following formulae.

12.4.1 Formulae for determining the density of solids

With compensation for air density

$$\rho = \frac{A}{A-B} (\rho_0 - \rho_L) + \rho_L$$

$$V = \alpha \frac{A - B}{\rho_0 - \rho_L}$$

Without compensation for air density

$$\rho = \frac{A \cdot \rho_0}{A-B}$$

$$V = \frac{A-B}{\rho_0}$$

- ρ = Sample density
- A = Weight of the sample in air
- B = Weight of the sample in the auxiliary liquid
- V = Sample volume
- ρ_0 = Density of the auxiliary liquid

ρ_L = Air density (0.0012 g/cm³)

α = Balance correction factor (0.99985), takes into account the buoyancy of the adjustment weight

12.4.2 Formulae for determining the density of liquids and pasty substances

With compensation for air density

$$\rho = \frac{\alpha \cdot P}{V_0} + \rho_L$$

Without compensation for air density

$$\rho = \frac{P}{V_0}$$

ρ = Density of liquid or pasty substance

P = Weight of displaced liquid or pasty substance

V_0 = Sinkers or gamma sphere volume

ρ_L = Air density (0.0012 g/cm³)

α = Balance correction factor (0.99985), takes into account the buoyancy of the adjustment weight

12.5 Density table for distilled water

T/°C	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
10.	0.99973	0.99972	0.99971	0.99970	0.99969	0.99968	0.99967	0.99966	0.99965	0.99964
11.	0.99963	0.99962	0.99961	0.99960	0.99959	0.99958	0.99957	0.99956	0.99955	0.99954
12.	0.99953	0.99951	0.99950	0.99949	0.99948	0.99947	0.99946	0.99944	0.99943	0.99942
13.	0.99941	0.99939	0.99938	0.99937	0.99935	0.99934	0.99933	0.99931	0.99930	0.99929
14.	0.99927	0.99926	0.99924	0.99923	0.99922	0.99920	0.99919	0.99917	0.99916	0.99914
15.	0.99913	0.99911	0.99910	0.99908	0.99907	0.99905	0.99904	0.99902	0.99900	0.99899
16.	0.99897	0.99896	0.99894	0.99892	0.99891	0.99889	0.99887	0.99885	0.99884	0.99882
17.	0.99880	0.99879	0.99877	0.99875	0.99873	0.99871	0.99870	0.99868	0.99866	0.99864
18.	0.99862	0.99860	0.99859	0.99857	0.99855	0.99853	0.99851	0.99849	0.99847	0.99845
19.	0.99843	0.99841	0.99839	0.99837	0.99835	0.99833	0.99831	0.99829	0.99827	0.99825
20.	0.99823	0.99821	0.99819	0.99817	0.99815	0.99813	0.99811	0.99808	0.99806	0.99804
21.	0.99802	0.99800	0.99798	0.99795	0.99793	0.99791	0.99789	0.99786	0.99784	0.99782
22.	0.99780	0.99777	0.99775	0.99773	0.99771	0.99768	0.99766	0.99764	0.99761	0.99759
23.	0.99756	0.99754	0.99752	0.99749	0.99747	0.99744	0.99742	0.99740	0.99737	0.99735
24.	0.99732	0.99730	0.99727	0.99725	0.99722	0.99720	0.99717	0.99715	0.99712	0.99710
25.	0.99707	0.99704	0.99702	0.99699	0.99697	0.99694	0.99691	0.99689	0.99686	0.99684
26.	0.99681	0.99678	0.99676	0.99673	0.99670	0.99668	0.99665	0.99662	0.99659	0.99657
27.	0.99654	0.99651	0.99648	0.99646	0.99643	0.99640	0.99637	0.99634	0.99632	0.99629
28.	0.99626	0.99623	0.99620	0.99617	0.99614	0.99612	0.99609	0.99606	0.99603	0.99600
29.	0.99597	0.99594	0.99591	0.99588	0.99585	0.99582	0.99579	0.99576	0.99573	0.99570
30.	0.99567	0.99564	0.99561	0.99558	0.99555	0.99552	0.99549	0.99546	0.99543	0.99540

12.6 Density table for ethanol

T/°C	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
10.	0.79784	0.79775	0.79767	0.79758	0.79750	0.79741	0.79733	0.79725	0.79716	0.79708
11.	0.79699	0.79691	0.79682	0.79674	0.79665	0.79657	0.79648	0.79640	0.79631	0.79623
12.	0.79614	0.79606	0.79598	0.79589	0.79581	0.79572	0.79564	0.79555	0.79547	0.79538
13.	0.79530	0.79521	0.79513	0.79504	0.79496	0.79487	0.79479	0.79470	0.79462	0.79453
14.	0.79445	0.79436	0.79428	0.79419	0.79411	0.79402	0.79394	0.79385	0.79377	0.79368
15.	0.79360	0.79352	0.79343	0.79335	0.79326	0.79318	0.79309	0.79301	0.79292	0.79284
16.	0.79275	0.79267	0.79258	0.79250	0.79241	0.79232	0.79224	0.79215	0.79207	0.79198
17.	0.79190	0.79181	0.79173	0.79164	0.79156	0.79147	0.79139	0.79130	0.79122	0.79113
18.	0.79105	0.79096	0.79088	0.79079	0.79071	0.79062	0.79054	0.79045	0.79037	0.79028
19.	0.79020	0.79011	0.79002	0.78994	0.78985	0.78977	0.78968	0.78960	0.78951	0.78943
20.	0.78934	0.78926	0.78917	0.78909	0.78900	0.78892	0.78883	0.78874	0.78866	0.78857
21.	0.78849	0.78840	0.78832	0.78823	0.78815	0.78806	0.78797	0.78789	0.78780	0.78772
22.	0.78763	0.78755	0.78746	0.78738	0.78729	0.78720	0.78712	0.78703	0.78695	0.78686
23.	0.78678	0.78669	0.78660	0.78652	0.78643	0.78635	0.78626	0.78618	0.78609	0.78600
24.	0.78592	0.78583	0.78575	0.78566	0.78558	0.78549	0.78540	0.78532	0.78523	0.78515
25.	0.78506	0.78497	0.78489	0.78480	0.78472	0.78463	0.78454	0.78446	0.78437	0.78429
26.	0.78420	0.78411	0.78403	0.78394	0.78386	0.78377	0.78368	0.78360	0.78351	0.78343
27.	0.78334	0.78325	0.78317	0.78308	0.78299	0.78291	0.78282	0.78274	0.78265	0.78256
28.	0.78248	0.78239	0.78230	0.78222	0.78213	0.78205	0.78196	0.78187	0.78179	0.78170
29.	0.78161	0.78153	0.78144	0.78136	0.78127	0.78118	0.78110	0.78101	0.78092	0.78084
30.	0.78075	0.78066	0.78058	0.78049	0.78040	0.78032	0.78023	0.78014	0.78006	0.77997

13 Differential Weighing Application

Navigation:  > [Differential weighing]



This section contains information and setting options for practical working with the application.

The majority of application settings are saved under the active user profile. Each user can select specific settings for this application. It must be ensured that the required user profile is selected.

Important

The specific data for differential weighing (definition and designation of, e.g. series and samples) and the results are stored in a database. This is irrespective of the user profile. There is only one database for all users.

For differential weighing, one or several samples are checked for weight variations. The first step consists of determining the initial weight of the sample (initial weighing). Certain sample components are subsequently removed or added. Processes, e.g. drying, centrifuging, filtering, incineration, evaporation and coating are also possible options. After processing, the sample is weighed again (residual weighing). The balance subsequently determines the difference between the two values.

Up to 99 series can be defined. Each series can consist of several samples (the balance can manage up to 500 samples in total). Each sample can be tared, initially weighed and residually weighed up to 3 times.

An automatic or manual procedure can also be defined for each series. With the automatic procedure, the user is guided through all steps of differential weighing for all samples (taring, initial weighing, residual weighing). With the manual procedure, the sample processing sequence can be selected by the user. Irrespective of the selected procedure, the balance continuously stores the current status for each sample. This prevents processes from being repeated by mistake. It is not possible to initially weigh the same sample twice for example.

Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

Selecting the application

- 1 Tap .
 - 2 Tap the [Differential weighing] icon in the selection window.
 - ⇒ The selected application is active.
 - ⇒ Some of the specific function keys and information fields for statistics are activated by default (factory defaults).
- ⇒ The balance is ready for weighing.

13.1 Settings for differential weighing application

Navigation:  > [Differential weighing] > 

Various specific differential weighing settings are available to suit specific application requirements.

All function keys are inactive as there are no specific settings for series and samples. Only a single series is predefined by default; however this does not contain any samples (**Series 1** with 0 samples).

Most of the setting options are the same as for the **Weighing** application. Only the settings that differ are described below.

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Menu item	Explanation	Further information
Series	Defines new series, processes and deletes existing series, selects a series for differential weighing.	See Defining, editing, deleting and selecting series (page 209)

Function Keys	Defines the function keys for differential weighing shown at the bottom of the display. These keys enable direct access to specific functions.	See Specific function keys for differential weighing (page 204)
Info Field	Defines the information fields to be displayed for differential weighing.	See Specific information fields for differential weighing (page 205)
Protocol	Selects information to be shown in the weighing protocols.	See Specific protocol information for differential weighing (page 205)
Print key	Defines whether the values of the selected sample or the complete series is printed when the  key is pressed.	See Behavior of the Print key (page 208)
Barcode	Defines the settings for processing barcode data.	See Specific setting for processing barcode data (page 208)

13.1.1 Specific function keys for differential weighing

Navigation:  > [**Differential weighing**] >  > **Function Keys**

This menu item can be used to activate the following specific function keys for differential weighing.

All other function keys are the same as for the **Weighing** application.

The numbered function keys are displayed in the application at the bottom of the display. The numbers define the sequence in the display.

- Activate or deactivate function keys by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.

► Application is activated.

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **Function Keys**, tap the [**Define**] button.
- 3 Select a function key by tapping.
 - ⇒ The function key is automatically numbered.
- 4 Change the settings and confirm with [**OK**].
- 5 To restore the factory default settings, tap [**STD**].
- 6 To exit the menu item, tap [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

	Designation	Explanation
	Sample ID	Defines a designation (max. 20 characters). Each sample of the current series can be assigned a designation.
	CL sample	Clears all measured values of a sample and changes the sample designation back to the standard text. The sample itself remains in the series.
	Series	Selects the series.
	Tare	Tares the sample container in a separate operation.
	T & wgh. in	Initiates taring of the sample container with subsequent initial weighing of the sample.

	Initial weighing	Initially weighs a sample in a separate operation.
	Residual wgh	Starts residual weighing of a sample.
	Info	Displays information relating to the current series (designations, measured values, results).
	No tare	Performs differential weighings without tare. This key should only be activated to measure a complete series without tare.
	Copy tare	Copies the tare weight of the first sample and for all further samples of the current series, the tare of which has not yet been determined.
	CL Value	Clears the previously determined weight (tare, initial or residual weight).

Factory setting: [T & wgh. in], [Residual wgh], [Series], [Info] und [CL Value] activated in this sequence.

13.1.2 Specific information fields for differential weighing

Navigation:  > [Differential weighing] >  > Info Field

This menu item contains the following information fields for differential weighing.

All other data fields are the same as for the **Weighing** application.

The information fields in the display provide constant information on, e.g. set values, measured results.

- Information fields can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all information fields must be deactivated and then activated in the required sequence.

► Application is activated.

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **Info Field**, tap the [Define] button.
- 3 Select **Info Field** by tapping.
 - ⇒ The information field is automatically numbered.
- 4 Change the settings and confirm with [OK].
- 5 To restore the factory default settings, tap [STD].
- 6 To exit the menu item, tap [OK].

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Values	Explanation
Series ID	Displays the designation of the selected series.
Procedure	Displays the procedure for the selected series (automatic or manual).
Number of samples	Displays the number of samples of the selected series.

Factory setting: Series ID, [Procedure] and Number of samples activated in this sequence.

13.1.3 Specific protocol information for differential weighing

Navigation:  > [Differential weighing] >  > Protocol

Here you define which data appears in the protocols. This large menu item is divided into three sub-menus. They enable you to make additional settings for the application. The rest of the available protocol data corresponds to the data for the **Weighing** application and is not described here.

The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.

► Application is activated.

- 1 Press [].
⇒ A window with application-dependent settings is displayed.
- 2 Under **Protocol**, tap the [**Define**] button.
⇒ **Protocol** window is displayed.
- 3 Under (e.g. **Header**), tap the [**Define**] button.
- 4 Select an information key by tapping.
⇒ The information key is automatically numbered.
- 5 To restore the factory default settings, tap [**STD**].
- 6 To exit the menu item, tap [**OK**].

The arrow buttons can be used to page forward or back to a menu page.

Note

The results and data can be printed out at any time.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [].

The following parameters can be defined:

Menu item	Explanation	Further information
Header	Define the information to be printed in the protocol header (before the results).	See Protocol header
Single value	Define the information to be recorded for each single result.	See Recording single values
Result	Define which statistical data is to be recorded.	See section Recording of results
Footer	Define information to be printed in the protocol footer after the results (single values).	See Protocol footer

Header line of protocols

Use this sub-menu to define which data is printed in the protocol header (before the results).

The following parameters can be defined:

Values	Explanation
Series ID	Records the series designation.

Factory setting: Appl. Name and **Date/Time** enabled in this order.

Recording of single values

The following parameters can be defined:

Values	Explanation
Series ID	Records the series designation.
Sample ID	Records the sample designation.
Tare time	Records the tare date and time.
Tare	Records the tare weight.
Weighing in time	Records the date and time of the initial weighing.

Weighing in	Records the initial weight.
Time 1 res.wgh	Records the date and time of the first residual weighing.
1.Residual wgh	Records the net weight of the first residual weighing.
Time 2 res.wgh	Records the date and time of the second residual weighing.
2.Residual wgh	Records the net weight of the second residual weighing.
Time 3 res.wgh	Records the date and time of the third residual weighing.
3.Residual wgh	Records the net weight of the third residual weighing.

Factory setting: **Sample ID**, **Tare**, **Weighing in** and **1.Residual wgh** activated in this sequence.

Recording of results

This submenu can be used to define the form in which the differential weighing results are printed.

The result protocol can be printed by pressing the  key if the Print key has been configured for printing series data.

The results are recorded in the selected display unit.

The formulae, on which the settings are based, can be found under - Formulae used for the calculation of differential weighing results.

The following parameters can be defined:

Values	Explanation
Diff.	Records the absolute difference in weight between initial weighing and residual weighing.
Diff. %	Records the difference between initial weighing and residual weighing as a percentage of the initial weight.
Abs. %	Records the residual weight as a percentage of the initial weight.
Atro AM	Records the moisture content of the sample as a percentage of the dry weight (ATRO Moisture Content).
Atro AD	Records the wet weight of the sample as a percentage of the dry weight (ATRO Dry Content).

Factory setting: **Diff.**, **Diff. %**, **Abs. %** and **Atro AM** activated in this sequence.

Protocol footer

This submenu can be used to define the information to be printed in the protocol footer after the results (single values).

The following parameters can be defined:

Values	Explanation
Series ID	Records the series designation.

Factory setting: **Signature** and **3 Blank Lines** activated in this sequence.

Number of decimal places

This submenu can be used to define the number of decimal places with which the differential weighing results are recorded.

Note

This setting refers only to the differential weighing results calculated by the application. In contrast, weights (tare, initial weighing, residual weighing) are always recorded in the maximum resolution of the respective balance.

The following parameters can be defined:

Values	Explanation
1 ... 5	Display the results in the protocol with the selected number of decimal places.

Factory setting: 3 activated.

13.1.4 Behavior of the Print key

Navigation: [☰] > [Differential weighing] > [☰] > **Print key**

This menu item can be used to define the data to be printed when the [☰] key is pressed.

► Application is activated.

- 1 Tap [☰].
⇒ A window with application-dependent settings is displayed.
- 2 Under **Print key**, tap the associated button.
⇒ A selection window is displayed.
- 3 Tap (e.g. **Sample**).
- 4 To exit the menu item, tap [OK].

The following parameters can be defined:

Menu item	Explanation	Further information
Sample	Printing the sample. When the [☰] key is pressed, a selection window displaying all samples of the current series is displayed. Select the sample to print the data.	
Series	Printing data. When the [☰] key is pressed, the data of all samples of the current series is printed.	

Factory setting: [Sample] activated.

13.1.5 Specific setting for processing barcode data

Navigation: [☰] > [Differential weighing] > [☰] > **Barcode**

This menu item contains an additional setting for differential weighing. The scanned barcode is interpreted as the sample identification. If the current series contains a sample with this ID, the associated sample is selected and is directly available for the next process step. If the current series does not contain the sample ID, an appropriate message is displayed.

Note

If a series contains several samples with identical ID, the first sample with an ID corresponding to the scanned barcode is selected.

► Application is activated.

- 1 Tap [☰].
⇒ A window with application-dependent settings is displayed.
- 2 Under **Barcode**, tap the associated button.
⇒ A selection window is displayed.
- 3 Tap **Sample ID**.
- 4 To exit the menu item, tap [OK].

Menu structure

Main menu	Submenu	Further information
Barcode	Off ID1 ID2 ID3 ID4 PreTare Host Open Input* Sample ID	See look-up table

* Factory setting

The following parameters can be defined:

Values	Explanation
Sample ID	Interprets the barcode as the sample identification.

13.2 Defining, editing, deleting and selecting series

Navigation: [☰] > [Differential weighing] > [☰] > Series

In order to perform a differential weighing, at least one series with minimum one sample must be defined. Press the [☰] key and select the menu for the definition of series. There are options for creating a new series as well as for editing and deleting existing series. Select the required series in the last menu item. These options are described in the following sections.

Note

When the application is started, the balance checks that at least 1 series is present. If this is not the case, the application automatically generates the series 1.

- ▶ Application **Diff.weighing** is activated.
 - ▶ Function keys are selected and activated.
- 1 Tap [☰].
 - ⇒ A window with application-dependent settings is displayed.
 - 2 Under **Series**, tap the [Define] button.
 - ⇒ A window with application-dependent settings is displayed.
 - 3 To exit the menu item, tap [OK].

13.2.1 Defining a new series

Navigation: [☰] > [Differential weighing] > [☰] > Series > [New]

This submenu can be used to define a new series.

- ▶ Application **Diff.weighing** is activated.
 - ▶ Function keys are activated.
- 1 Tap [☰].
 - ⇒ A window with application-dependent settings is displayed.
 - 2 Under **Series**, tap the [New] button.
 - ⇒ **Series editor** window is displayed.
 - 3 Under **Designation**, tap the associated button.
 - ⇒ An alphanumeric input window is displayed.
 - ⇒ The series are consecutively numbered by default (series x).
 - 4 Enter the designation and confirm with [OK].
 - 5 Under **Number of samples**, tap the associated button.
 - ⇒ A numeric input window is displayed.
 - 6 Enter the number of samples and confirm with [OK].
 - 7 Under **Procedure**, tap the associated button.
 - ⇒ A selection window is displayed.
 - 8 Tap, e.g. [Automatic].
 - 9 Under **Sample ID**, tap the associated button.
 - ⇒ A selection window is displayed.
 - 10 Enter the sample.
 - ⇒ An alphanumeric input window is displayed.
 - ⇒ The samples are consecutively numbered by default (sample x).
 - 11 Enter the designation and confirm with [OK].
 - 12 To exit the menu item, tap [C].

13 To exit the menu item, tap [OK].

The following parameters can be defined:

Values	Explanation
Designation	Defines the series designation (max 20 characters).
Number of samples	Defines the number of samples of the series (max. 500 samples). Note The balance can manage a maximum of 500 samples in total. Available for each series therefore is a maximum of 500 samples, minus the number already used. If a value that exceeds the number of available samples is entered, an appropriate error message is displayed (this can take some time).
Procedure	Selects between an automatic or manual procedure. Automatic = the user is guided through all steps of differential weighing (taring, initial weighing, residual weighing). Manual = the user can select the sample processing sequence.
Sample ID	Defines the sample designation (max. 20 characters). Note If the function key with the same name is activated, the sample designations can be directly changed.

13.2.2 Editing an existing series

Navigation:  > [Differential weighing] >  > Series > [Edit]

This submenu can be used to edit an existing series. After tapping **Series [Edit]**, a selection window is displayed. Select the series to be edited. The same options are available for editing as for the definition of a new series.

Attention

All series are stored in a single database available to all users. Series created by other users can also be edited. Series must be edited with due care and other application users should be consulted if necessary.

Note

The number of samples of a series can only be reduced to the extent that no samples for which measured values are already available can be deleted. Example: If the number of samples of a series is reduced from 20 to 10 and measured values are already available for sample 15, the number of samples can only be reduced to 15. A further reduction is only possible after the measured values of the respective samples have been cleared (in this example, the measured values of samples 11 – 15).

► Application **Diff.weighing** is activated.

- 1 Tap .
⇒ A window with application-dependent settings is displayed.
- 2 Under **Series**, tap the [Edit] button.
⇒ A selection window is displayed.
- 3 Tap a series.
⇒ **Series editor** window is displayed.
- 4 Settings can be changed by tapping the associated button.
- 5 To exit the menu item, tap [OK].

13.2.3 Deleting a series

Navigation:  > [Differential weighing] >  > Series > [CL Last]

This submenu can be used to delete an existing series. After tapping **Series [CL Last]**, a selection window is displayed. Select the series to be deleted. A request is displayed prior to deletion. If the request is confirmed with the **[Yes]** key, the series with all recorded measured values and calculated results is deleted.

Attention

All series are stored in a single database available to all users. Series created by other users can also be deleted. Series must be deleted with due care and other application users should be consulted if necessary.

▶ Application **Diff.weighing** is activated.

- 1 Tap **[☰]**.
⇒ A window with application-dependent settings is displayed.
- 2 Under **Series**, tap the **[CL Last]** button.
⇒ A selection window is displayed.
- 3 Tap a series.
⇒ A confirmation window **Do you really want to delete this serie?** is displayed.
- 4 To delete the series confirm with **[Yes]**.
⇒ The series is deleted.
- 5 To exit the menu item, tap **[OK]**.

13.2.4 Selecting a series for differential weighing

Navigation: **[☰]** > **[Differential weighing]** > **[☰]** > **Series** > **[Selection]**

This submenu can be used to select a series for differential weighing. After tapping **Series [Selection]**, a selection window is displayed. Select the required series. If the **[Series]** function key is activated, the series can be directly selected by pressing the key.

▶ Application **Diff.weighing** is activated.

▶ Function key is activated.

- 1 Tap **[☰]**.
⇒ A window with application-dependent settings is displayed.
- 2 Under **Series**, tap the **[CL Last]** button.
⇒ A selection window is displayed.
- 3 Tap a series.
⇒ A confirmation window **Do you really want to delete this serie?** is displayed.
- 4 To delete the series confirm with **[Yes]**.
⇒ The series is deleted.
- 5 To exit the menu item, tap **[OK]**.

13.3 Working with the differential weighing application

Navigation: **[☰]** > **[Differential weighing]**

This section describes the procedure for working with the **Differential weighing** application and recording the results.

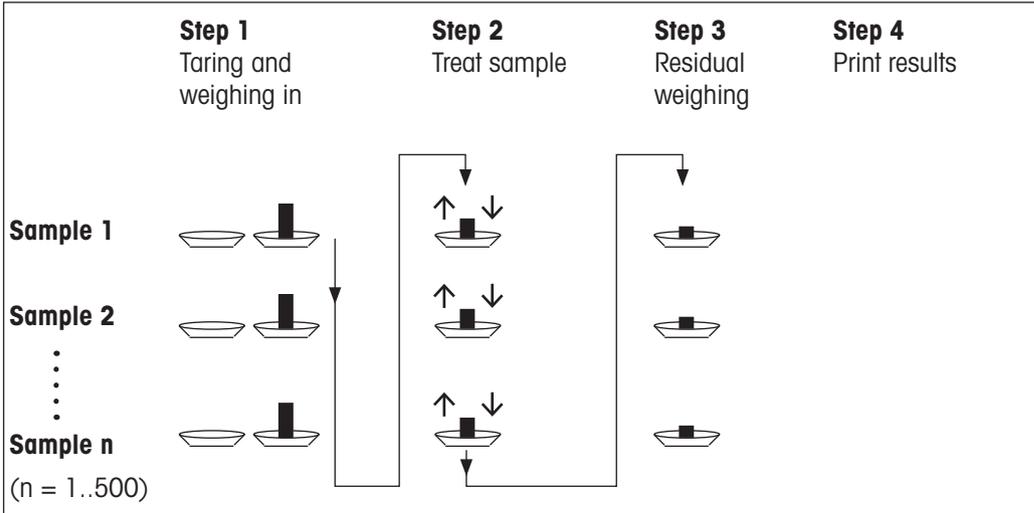
13.3.1 The various differential weighing methods

There are three different working methods for differential weighing which are supported by the **Differential weighing** application. These three working methods are described below.

Method 1 (with taring and initial weighing in a single cycle)

This is the simplest method as the tare weight of the sample container and the initial weight (net weight) of the sample are determined in a single operation.

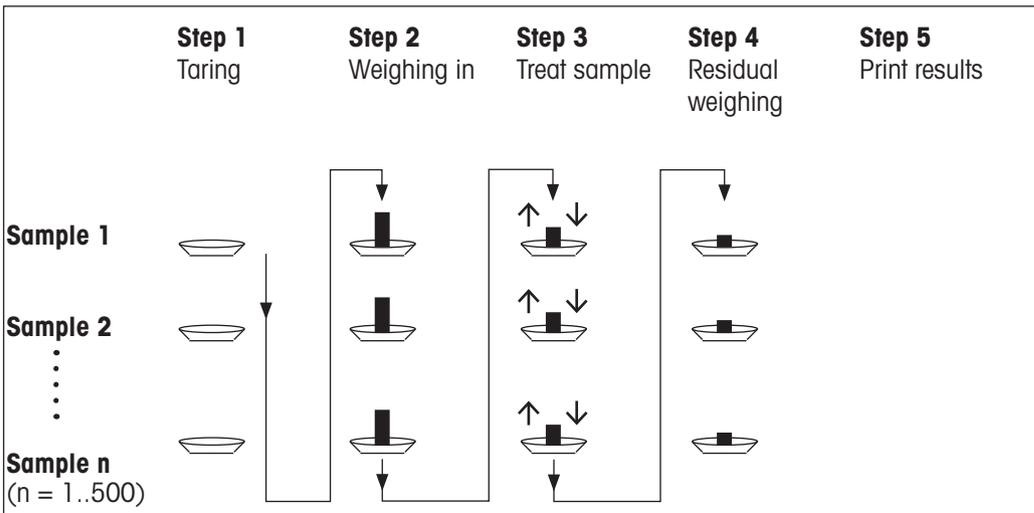
For this method, activate the [T & wgh. in] and [Residual wgh] function keys.



Method 2 (with separate taring and initial weighing)

With this method, the sample container weight (tare weight) and the initial weight (net weight) of the sample are determined in separate operations. With this method, all weighing containers can initially be tared before all weighings are performed in a second operation.

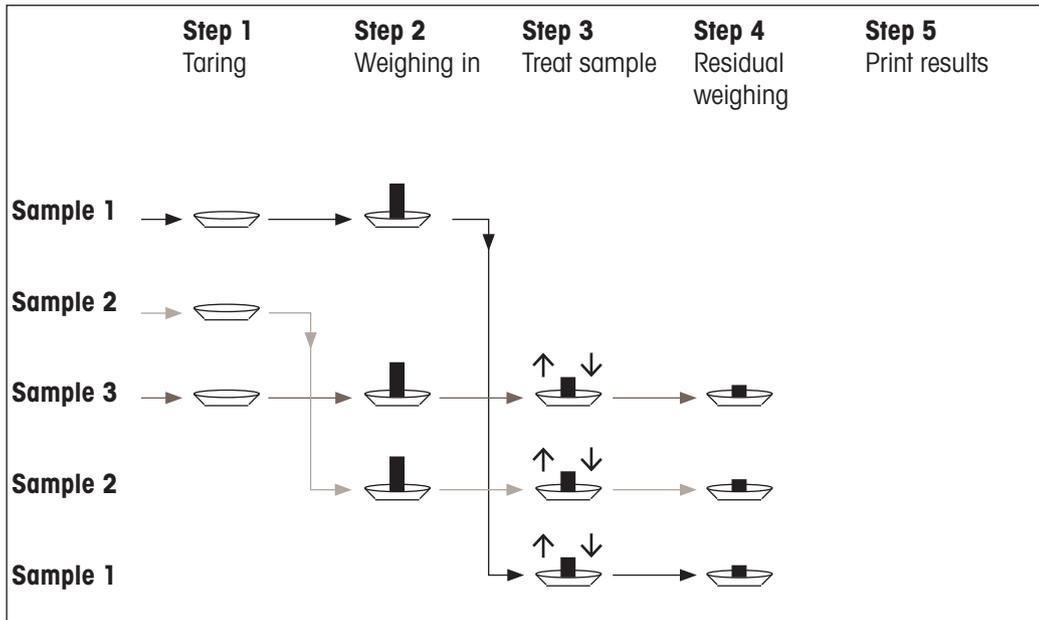
For this method, activate the [Tare], [Initial weighing] and [Residual wgh] function keys.



Method 3 (free working)

Whereas methods 1 and 2 progress from one sample to the next, method 3 allows free working. Taring, initial weighing and residual weighing can be performed as single steps for each sample. Not all 3 steps need to be performed for a specific sample before the next sample is processed. The following diagram is a free working example:

For this method, activate the [Tare], [Initial weighing] and [Residual wgh] function keys.



13.3.2 Initial settings

Depending on the working method, appropriate initial settings should be made.

Irrespective of the working method, the 2 following function keys must be activated for each differential weighing. This selects the series and performs a residual weighing. The series can also be selected via the menu.



Series – Activate function keys.



Residual wgh

The following function keys must also be activated in order to:

- change the sample designation (also possible via the menu);
- display already existing measured values for the current series;
- clear the last determined value.



ID – Activate function keys.



Info



CL Value

When working with method 1, the following function key must also be activated.



T & wgh. in – Activate function key.

When working with method 2 or method 3, the following function keys must also be activated.



Tare – Activate function keys.



Initial weighing

The following function keys must be activated for specific cases. This enables the first tare weight to be copied to all further samples and differential weighing of a series without tare.



Copy tare

– Activate function keys.



No tare

13.3.3 Differential weighing with automatic procedure

In this description, it is assumed that the automatic procedure has been selected for the series to be processed. The automatic procedure guides the user through methods 1 or 2. The automatic procedure can be left at any time and a change to a manual procedure made. A change from a manual to an automatic procedure is also possible at any time.

Preparatory work

The currently active series is displayed in the **Series ID** information field. Another series can be processed by tapping the [**Series**] function key and selecting the required series. To avoid operating errors, only those function keys are active that are available for the next working step. The other keys are grayed and not accessible.

A standard sample designation can be changed by tapping the **Sample ID** function key if the change has not already been made in the definition of the series. The required designation must be entered for each sample of a series. The selected designations are also shown in the protocols.

The current differential weighing result can be printed with the [] key. Depending on the settings, either the selected sample or complete series is recorded. A selection window is displayed prior to printing. Select the sample for which values are to be recorded.

▶ A printer is connected and activated as an output device in the peripheral device settings.

– To print out the settings, press [].

Taring and initial weighing of samples

Taring and initial weighing can be carried out in a single operation with the [**T & wgh. in**] function key. Taring and initial weighing can be separated by defining a specific [**Tare**] and [**Initial weighing**] function key.

The arrow keys can be used to page between the previous and next sample.

Note

Taring or initial weighing can be interrupted at any time; the previously determined weights remained stored. When the [**T & wgh. in**] function key is pressed again, the balance automatically displays the first sample for which no tare or initial weight is available.

▶ Function keys are activated.

▶ The automatic procedure is activated.

1 Tap [**T & wgh. in**].

⇒ The balance displays the first sample of the series for which no tare and initial weight is available.

2 Confirm with [**OK**].

⇒ The balance requests that the weighing container (tare weight) for the first sample is placed on the balance.

3 Place the sample on the balance and confirm with [**OK**].

⇒ The balance determines the weight.

⇒ The balance requests initial weighing.

4 Place the sample in the weighing container and confirm with [**OK**].

⇒ The balance determines the weight.

⇒ The balance requests that the sample is removed.

- 5 Remove the sample container with the sample and confirm with **[OK]**.
 - ⇒ Initial weighing of the first sample of the series is complete.
 - ⇒ The balance subsequently automatically starts the above described taring and initial weighing of all further samples of the series.
 - ⇒ The balance displays the next sample of the series for which no tare and initial weight are available.
- 6 Confirm with **[OK]**.
 - ⇒ The balance requests that the weighing container (tare weight) for the sample is placed on the balance.
- 7 Place the sample on the balance and confirm with **[OK]**.
 - ⇒ The balance determines the weight.
 - ⇒ The balance requests initial weighing.
- 8 Place the sample in the weighing container and confirm with **[OK]**.
 - ⇒ The balance determines the weight.
 - ⇒ The balance requests that the sample is removed.
- 9 Remove the sample container with the sample and confirm with **[OK]**.
 - ⇒ The balance confirms that taring and initial weighing has been carried out for all samples of the series.
- 10 Confirm with **[OK]**.
 - ⇒ The balance is ready for residual weighing.

Residual weighing of samples

Each sample can be residually weighed up to 3 times (e.g. for samples where components are removed or added in several working steps). A window is displayed where residual weighing can be selected. Since no residual weighing has been carried out in the following example, only the first residual weighing is currently available.

The balance displays the first sample of the series for which no corresponding residual weight is available. Another sample can be residually weighed by tapping one of the arrow keys. Paging can take place between the previous and next sample.

A further residual weighing can be carried out by tapping the **[Residual wgh]** function key. The required residual weighing can be selected from the displayed list. A maximum of 3 residual weighings per sample can be made.

Note

Each residual weighing can be interrupted at any time; the previously determined weights remain stored. The balance automatically displays the first sample for which no residual weight is available when the **[Residual wgh]** function key is subsequently tapped again.

- ▶ Function keys are activated.
 - ▶ The automatic procedure is activated.
- 1 Tap **[Residual wgh]**.
 - 2 Tap the **[1.Residual wgh]** button.
 - ⇒ The balance displays the first residual weighing for which no residual weight is available.
 - 3 Confirm with **[OK]**.
 - ⇒ The balance requests that the residual weight for the first sample is placed on the balance.
 - 4 Place the residual weight on the balance and confirm with **[OK]**.
 - ⇒ The balance determines the residual weight.
 - ⇒ The balance requests that the sample is removed.
 - 5 Remove the sample and confirm with **[OK]**.
 - ⇒ Residual weighing of the first sample of the series is complete.

- ⇒ The balance subsequently automatically starts the above described operation for residual weighing of all further samples of the series.
- ⇒ The balance displays the next sample of the series for which no residual weight is available.
- 6 Confirm with [**OK**].
 - ⇒ The balance requests that the residual weight for the sample is placed on the balance.
- 7 Place the sample on the balance and confirm with [**OK**].
 - ⇒ The balance determines the residual weight.
 - ⇒ The balance requests that the sample is removed.
- 8 Remove the sample and confirm with [**OK**].
 - ⇒ The balance confirms that residual weighing has been carried out for all samples of the series.
- 9 Confirm with [**OK**].
 - ⇒ Differential weighing is complete.

Displaying differential weighing results

The differential weighing results can be displayed at any time with the [**Info**] function key. The results for the first sample are displayed. The results and further samples can be displayed at the bottom right of the window by tapping one of the arrow keys. If the results of a sample include several windows, selection can be made between the individual result windows with the scroll keys at the bottom left corner of the window.

The formulae, on which the settings are based, can be found under - Formulae used for the calculation of differential weighing results.

Note

If several residual weighings have been carried out, these are displayed as **NR 2** or **NR 3**. The results are also displayed with the corresponding numbers, e.g. **Diff. 1**.

Values	Explanation
Series ID	Records the series designation.
Sample ID	Records the sample designation.
T	Records the tare weight of the sample.
NE	Records the initial weight.
NR 1	Records the net weight of the first residual weighing.
Diff. 1	Records the absolute difference in weight between initial weighing and the first residual weighing of the sample.
Diff. % 1	Records the difference between initial weighing and residual weighing as a percentage of the initial weight.
Abs. % 1	Records the residual weight as a percentage of the initial weight.
Atro AM 1	Records the moisture content of the sample as a percentage of the dry weight.
Atro AD 1	Records the wet weight of the sample as a percentage of the dry weight.

13.3.4 Differential weighing with manual sequence

Differential weighing with a manual sequence differs from the automatic sequence in that the sample processing sequence can be defined by the user.

When differential weighing is started with the [**T & wgh. in**] function key, a selection window is initially displayed. Select the sample for taring and weighing.

In contrast to the automatic sequence, the application does not automatically return to the first sample, the value of which is not yet available. The sample to be processed must be selected by the user. The sequence after taring and initial weighing of the first sample is ended and not automatically restarted. Further samples can now either be tared and initially weighed or residual weighing carried out for the first sample with the [**Residual wgh**] function key. The sample selection window is also displayed for residual weighing.

Note

The sample selection window only displays the samples for which the appropriate operation has not yet been carried out.

Preparatory work

The currently active series is displayed in the **Series ID** information field. Another series can be processed by tapping the [**Series**] function key and selecting the required series. To avoid operating errors, only those function keys are active that are available for the next working step. The other keys are grayed and not accessible.

A standard sample designation can be changed by tapping the **Sample ID** function key if the change has not already been made in the definition of the series. The required designation must be entered for each sample of a series. The selected designations are also shown in the protocols.

The current differential weighing result can be printed with the [Print] key. Depending on the settings, either the selected sample or complete series is recorded. A selection window is displayed prior to printing. Select the sample for which values are to be recorded.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [Print].

Taring and initial weighing of samples

Taring and initial weighing can be carried out in a single operation with the [**T & wgh. in**] function key. Taring and initial weighing can be separated by defining a specific [**Tare**] and [**Initial weighing**] function key.

The arrow keys can be used to page between the previous and next sample.

- ▶ Function keys are activated.
- 1 Tap [**T & wgh. in**].
 - ⇒ A selection window is displayed.
 - 2 Tap the sample to be processed.
 - ⇒ The balance requests that the weighing container (tare weight) for the first sample is placed on the balance.
 - 3 Place the sample on the balance and confirm with [**OK**].
 - ⇒ The balance determines the weight.
 - ⇒ The balance requests initial weighing.
 - 4 Place the sample in the weighing container and confirm with [**OK**].
 - ⇒ The balance determines the weight.
 - ⇒ The balance requests that the sample is removed.
 - 5 Remove the sample container with the sample and confirm with [**OK**].
 - ⇒ Initial weighing of the first sample of the series is complete.
 - 6 Tap [**T & wgh. in**].
 - ⇒ A selection window is displayed.
 - 7 Tap the sample to be processed.
 - ⇒ The balance requests that the weighing container (tare weight) for the sample is placed on the balance.
 - 8 Place the sample on the balance and confirm with [**OK**].
 - ⇒ The balance determines the weight.
 - ⇒ The balance requests initial weighing.
 - 9 Place the sample in the weighing container and confirm with [**OK**].
 - ⇒ The balance determines the weight.
 - ⇒ The balance requests that the sample is removed.
 - 10 Remove the sample container with the sample and confirm with [**OK**].

- ⇒ Taring and initial weighing is complete.
- ⇒ The balance is ready for residual weighing.

Residual weighing of samples

Each sample can be residually weighed up to 3 times (e.g. for samples where components are removed or added in several working steps). A window is displayed where residual weighing can be selected. Since no residual weighing has been carried out in the following example, only the first residual weighing is currently available.

The balance displays the first sample of the series for which no corresponding residual weight is available. Another sample can be residually weighed by tapping one of the arrow keys. Paging can take place between the previous and next sample.

A further residual weighing can be carried out by tapping the [**Residual wgh**] function key. The required residual weighing can be selected from the displayed list. A maximum of 3 residual weighings per sample can be made.

► Function keys are activated.

- 1 Tap [**Residual wgh**].
 - 2 Tap the [**1.Residual wgh**] button.
 - ⇒ A selection window is displayed.
 - 3 Tap the sample to be processed.
 - ⇒ The balance requests that the residual weight for the first sample is placed on the balance.
 - 4 Place the residual weight on the balance and confirm with [**OK**].
 - ⇒ The balance determines the residual weight.
 - ⇒ The balance requests that the sample is removed.
 - 5 Remove the sample and confirm with [**OK**].
 - ⇒ Residual weighing of the first sample of the series is complete.
 - 6 Tap [**Residual wgh**].
 - 7 Tap the [**1.Residual wgh**] button.
 - 8 Tap the sample to be processed.
 - ⇒ The balance requests that the residual weight for the sample is placed on the balance.
 - 9 Place the sample on the balance and confirm with [**OK**].
 - ⇒ The balance determines the residual weight.
 - ⇒ The balance requests that the sample is removed.
 - 10 Remove the sample and confirm with [**OK**].
 - ⇒ Residual weighing is complete.
- ⇒ Differential weighing is complete.

Displaying differential weighing results

The differential weighing results can be displayed at any time with the [**Info**] function key. The results for the first sample are displayed. The results and further samples can be displayed at the bottom right of the window by tapping one of the arrow keys. If the results of a sample include several windows, selection can be made between the individual result windows with the scroll keys at the bottom left corner of the window.

The formulae, on which the settings are based, can be found under - Formulae used for the calculation of differential weighing results.

Note

If several residual weighings have been carried out, these are displayed as **NR 2** or **NR 3**. The results are also displayed with the corresponding numbers, e.g. **Diff. 1**.

Values	Explanation
Series ID	Records the series designation.
Sample ID	Records the sample designation.
T	Records the tare weight of the sample.
NE	Records the initial weight.
NR 1	Records the net weight of the first residual weighing.
Diff. 1	Records the absolute difference in weight between initial weighing and the first residual weighing of the sample.
Diff. % 1	Records the difference between initial weighing and residual weighing as a percentage of the initial weight.
Abs. % 1	Records the residual weight as a percentage of the initial weight.
Atro AM 1	Records the moisture content of the sample as a percentage of the dry weight.
Atro AD 1	Records the wet weight of the sample as a percentage of the dry weight.

13.3.5 Example of a differential weighing protocol

The detail of a protocol depends on the selected protocol settings. Only application-specific information is shown in the example printout.

The current differential weighing result can be printed with the  key. Depending on the settings, either the selected sample or complete series is recorded. A selection window is displayed prior to printing. Select the sample for which values are to be recorded.

Example: Printout

```

- Differential weighing-
25.Jul 2013          15:49
Sample ID           M414/1
T                   6.7125 g
NE                  17.0930 g
NR 1                15.6778 g
Diff. 1             -1.4152 g
Diff. % 1           -8.279 %
Abs. % 1            91.721 %
Atro AM 1           -9.027 %

Signature
.....

```

13.3.6 Further options

Further options for the **Differential weighing** application are described in this section.

Clearing a single value

If an error is noticed after determining a weight (tare, initial weighing, residual weighing), the last determined value can be cleared with the **[CL Value]** function key. However, this is only possible if no menu has been selected and the application has not been left. After changing a sample or series, the last determined value can no longer be cleared.

- ▶ Function key is activated.
- 1 Tap the **[CL Value]** function key.
 - ⇒ A confirmation window **Are you sure you want to clear this entry?** is displayed.
- 2 To clear the value, tap **[Yes]**.
 - ⇒ The value is cleared.

⇒ **Entry cleared** window is displayed.

3 Confirm with [**OK**].

⇒ The value is cleared.

Clearing all values of a sample

If an error is made during differential weighing, all measured values of a single sample can be cleared. To clear the values of a sample, the [**CL sample**] function key must be activated.

Attention

All series and samples are stored in a single database available to all users. The series and samples defined by other users can be cleared. Series and samples must be cleared with due care and other application users consulted if necessary.

▶ Function key is activated.

1 Tap the [**CL sample**] function key.

⇒ A selection window is displayed.

2 Tap on the sample to be cleared.

⇒ A confirmation window **Are you sure you want to clear all entries of this sample?** is displayed.

3 To clear values, tap [**Yes**].

⇒ Values are cleared.

⇒ **Sample cleared** window is displayed.

4 Confirm with [**OK**].

⇒ Values are cleared.

Copy tare

The tare weight of the first sample can be copied for all further samples of the series for which no tare weight is available with the [**Copy tare**] function key (existing tare weights are retained!). This can save time if the same tare container is used for all samples.

Note

The function key is inactive as long as no tare weight has been determined for the first sample or if samples of the series already have a tare weight.

▶ Function key is activated.

▶ Tare weight for sample is copied.

1 Tap the [**Copy tare**] function key.

⇒ A confirmation window **Are you sure you want to copy the first tare weight to all free samples?** is displayed.

2 To copy the tare weight, tap [**Yes**].

⇒ Tare weight is copied.

⇒ **Copy tare weight done** window is displayed.

3 Confirm with [**OK**].

⇒ Tare weight is copied.

Differential weighing without tare

For specific applications where no tare containers are used (e.g. filter weighings), the tare can be suppressed for the complete series. This saves time. To process a series without tare, the [**No tare**] function key must be activated.

If tare is suppressed, this applies to all samples of the series for which no tare weight is available. Existing tare weights are retained. All not yet available tare weights are set to zero. If a tare weight is nonetheless determined for a specific sample of this series, all measured values of the respective sample must initially be cleared.

- ▶ Function key is activated.
- 1 Tap the [**No tare**] function key.
 - ⇒ A confirmation window **Are you sure you do not need a tare for this series?** is displayed.
- 2 Confirm with [**Yes**].
 - ⇒ Tare weight is cleared.
 - ⇒ **No tare function done** window is displayed.
- 3 Confirm with [**OK**].
 - ⇒ Tare weight is cleared.

13.4 Formulae used for the calculation of differential weighing results

Diff.	$\text{Residual weight} - \text{Initial weight}$
Diff. %	$\frac{(\text{Residual weight} - \text{Initial weight}) \cdot 100\%}{\text{Initial weight}}$
Abs. %	$\frac{\text{Residual weight} \cdot 100\%}{\text{Initial weight}}$
Atro AM [0 ... 1000 %]	$- \frac{[\text{Initial weight (wet weight)} - \text{Residual weight (dry weight)}] \cdot 100\%}{\text{Residual weight (dry weight)}}$
Atro AD [110 ... 1000 %]	$\frac{\text{Initial weight (wet weight)} \cdot 100\%}{\text{Residual weight (dry weight)}}$

14 Pipette Check Application

Navigation:  > [Pipette Check]



This section contains information and setting options for practical working with the application.

This application requires the use of the optional accessory EasyScan™.

All application settings are saved under the active user profile. Each user can select specific settings for this application. It must be ensured that the required user profile is selected.

Terms

Since pipette checks are subject to inaccuracy, **Sys. error E** and **Random Error s** can occur time and again. **Sys. error E** is a deviation between the nominal and mean value of measured test values.

Random Error s is a measure for the variation of determined volume values, i.e. denotes the relative standard deviation.

Random errors can be small if measured values are close together, however **systematic errors** can be large if the calculated mean value is far from the nominal value. This can also be the reverse. Ideally both measurement errors should be as small as possible.

Options

The pipette check application offers various options:

Pipette check

When a configured pipette is held in front of EasyScan™, the application checks the calibration and Quick-Check dates and displays the result.

Quick-Check

Quality management systems conforming to standards such as ISO 9000, GLP or GMP require regular testing of volumetric measuring devices. Quick-Check checks the accuracy of pipettes.

Quick-Check allows the accuracy of pipettes of any manufacturer with a Mettler-Toledo RFID tag to be checked.

Training

With this option, pipetting can be practiced or a system test performed. Before attempting to pipette with sensitive or expensive liquids, it may be necessary to check whether the required accuracy with a specific pipette can be achieved on a specific balance. How to perform a system test. The training option can also be used for performing such "system tests".

Training can be performed with pipettes of any manufacturer. An RFID tag is not required as it is not supported by the balance using the training option.

Pipette configuration

Before using the RFID tag for the first time, the configuration data must be entered. It may also be necessary to adapt data to an already configured pipette (if, e.g. the pipette was calibrated, but the provider had not entered the next calibration date).

Other functions

The pipette check application offers no pipette calibration functions. If calibration is required after checking, contact the pipette manufacturer.

For the **Quick-Check** and **Training** options, we recommend the use of a precision thermometer, barometer, hygrometer and moisture trap.

Selecting the application

- 1 Tap .
- 2 Tap the [Pipette Check] icon in the selection window.
 - ⇒ The selected application is active.
 - ⇒ Some of the specific function keys and protocol information for the pipette check are activated by default (factory defaults).

⇒ The balance is ready for the pipette check.

14.1 Pipette check application settings

Navigation:  > [**Pipette Check**] > 

Different specific pipette check settings are available, which can be used to adapt the application to suit specific requirements.

Most of the settings are the same as the **Weighing** application. Only the pipette check specific settings are described below.

The arrow buttons can be used to page forward or back to a menu page.

Menu item	Explanation	Further information
QuickCheck Options	Defines the behavior of Quick-Check.	see Specific Quick-Check option settings (page 223)
Training Options	Defines the training behavior.	see Specific training option settings (page 223)
RFID Recognition Beep	Defines the behavior of the RFID recognition beep.	see Specific RFID recognition beep settings (page 224)
Function Keys	Defines the function keys for the pipette check to appear at the bottom of the display. These keys enable direct access to specific functions.	See Specific pipette check application function keys (page 224)
QuickCheck Protocol	Selects information to be shown in the Quick-Check protocols.	see Specific Quick-Check protocol information (page 224)
Training Protocol	Selects information to be shown in the training protocols.	see Specific training protocol information (page 226)

14.1.1 Specific Quick-Check option settings

Navigation:  > [**Pipette Check**] >  > **Pipette Check Options** > [**Define**]

This menu can be used to define the behavior of Quick-Check.

The following parameters can be defined:

Parameters	Explanation	Values
Stabilization time	Defines the stabilization time in seconds (numerical entry).	3 ... 100 (5)*
Measurement end beep	Activates/deactivates the beep at the end of measurement.	Off On*
Auto start next sample	Activates/deactivates automatic start of pipetting detection. Off : To start pipetting the next sample, confirm the result with [OK] .	Off On*

* Factory setting

14.1.2 Specific training option settings

Navigation:  > [**Pipette Check**] >  > **Training Protocol**

The following parameters can be defined:

Parameters	Explanation	Values
Stabilization time	Defines the stabilization time in seconds (numerical entry).	3 ... 100 (5)*
No. of measurements	Defines the number of measurements for training (numerical entry).	1 ... 100 (5)*

Training liquid	Defines the liquid used for training.	Water* Others
Measurement end beep	Activates/deactivates the beep at the end of measurement.	Off On*
Auto start next sample	Activates/deactivates automatic start of pipetting detection. Off : To start pipetting the next sample, confirm the result with [OK].	Off On*

* Factory setting

14.1.3 Specific RFID recognition beep settings

Navigation:  > [Pipette Check] >  > **RFID recognition beep**

Parameters	Explanation	Values
RFID Recognition Beep	Activates/deactivates the RFID recognition beep. The beep sounds when the RFID reader has scanned the RFID tag data.	Off On*

* Factory setting

14.1.4 Specific pipette check application function keys

Navigation:  > [Pipette Check] >  > **Function Keys**

Function keys enable direct access to specific functions and settings in the application. A function can be activated by tapping a key.

The numbered function keys are displayed in the application at the bottom of the display. The numbers define the sequence in the display.

- Activate or deactivate function keys by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.

The arrow buttons can be used to page forward or back to a menu page.

► Application is activated.

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **Function Keys**, tap the [Define] button.
- 3 Select a function key by tapping.
 - ⇒ The function key is automatically numbered.
- 4 Change the settings and confirm with [OK].
- 5 To restore the factory default settings, tap [STD].
- 6 To exit the menu item, tap [OK].

	Designation	Explanation
	Training	Starts training.
	Setup	Starts setup.
	HowTo	Display pipetting instructions.

14.1.5 Specific Quick-Check protocol information

Navigation:  > [Pipette Check] >  > **QuickCheck Protocol** > [Define]

Here you define which data appears in the protocols. This large menu item is divided into three sub-menus. They enable you to make additional settings for the application. The rest of the available protocol data corresponds to the data for the **Weighing** application and is not described here.

The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.

The arrow buttons can be used to page forward or back to a menu page.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

The following parameters can be defined:

Menu item	Explanation	Further information
Header	Define the information to be printed in the protocol header (before the results).	See Protocol header
Single value	Defines the information to be recorded for each individually tested volume.	See Section Recording single values
Footer	Define information to be printed in the protocol footer after the results (single values).	See Protocol footer

Header line of protocols

Use this sub-menu to define which data is printed in the protocol header (before the results).

The following parameters can be defined:

Values	Explanation
Balance Type	The balance type is printed. The balance type is generated by the balance and cannot be changed by the user.
SNR	The serial numbers of the balance and terminal are printed. The serial numbers of the balance and terminal are generated by the balance and cannot be changed.
Pipette model	The pipette type is printed.
Pipette SNR	Prints the pipette serial number.
Nominal vol.	Records the nominal volume of the pipette.
No. of measurements	Records the number of measurements.
Env. data	Records the air pressure, air temperature, water temperature and humidity.
Conv. factor Z	Records the conversion factor Z.
Overall result	Records whether Quick-Check was passed or failed.

Factory setting: **Appl. Name**, **Date/Time**, **Pipette SNR** and **Pipette model** activated in this sequence.

Recording single values (values for each check volume)

The following parameters can be defined:

Values	Explanation
Check vol.	Records the check volume.
Limit	Records the maximum permissible check volume system error and random error (tolerance limits).
Meas. details	Records details of the measurement (number and calculated volume of each sample).

Statistics	Records: <ul style="list-style-type: none"> • average sample volume • check volume systematic error [μl] und [%] • check volume random error [μl] und [%] • calculated measurement uncertainty
Result	Records the volume result (passed/failed).

Factory setting: **Check vol.** and **Result** activated in this sequence.

Protocol footer

The following parameters can be defined:

Values	Explanation
Overall result	Records whether Quick-Check was passed or failed.

Factory setting: **Overall result**, **Signature** and **3 Blank Lines** activated in this sequence.

14.1.6 Specific training protocol information

Navigation:  > [**Pipette Check**] >  > **Training Protocol** > [**Define**]

Header line of protocols

The following parameters can be defined:

Values	Explanation
Balance Type	The balance type is printed. The balance type is generated by the balance and cannot be changed by the user.
SNR	The serial numbers of the balance and terminal are printed. The serial numbers of the balance and terminal are generated by the balance and cannot be changed.
Liquid name	The name of the liquid is printed.
Env. data	If Training liquid: Water , the air pressure, air temperature, water temperature and humidity are recorded. If Training liquid: Others , the density of the used liquid is recorded.
Conv. factor Z	If Training liquid: Water , the conversion factor Z is recorded.

Factory setting: **Appl. Name**, **Date/Time** and **Liquid name** activated in this sequence.

Recording single values (values for each check volume)

The following parameters can be defined:

Values	Explanation
No. of measurements	Records the number of measurements.
Meas. details	Records details of the measurement (number and calculated volume of each sample).
Average vol. x	Records the average sample volume.
Standard dev.	Records the standard deviation of measurements.

Factory setting: **No. of measurements**, **Average vol. x** and **Standard dev.** activated in this sequence.

14.2 Working with the pipette check application

Navigation:  > [**Pipette Check**]

This section describes working with the **Pipette Check** application. It is assumed that the **Pipette Check** application is selected and the application-specific settings have been made. If an evaporation trap is available, it should be installed. A precision thermometer, barometer and a hygrometer, if required, should be available.

Important

Test liquid, sample container, pipette and pipette tip should be acclimatized.

- ▶ A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press [⏏].

This application requires the use of the optional accessory EasyScan™.

14.2.1 Pipette check

Navigation: [☰] > [Pipette Check]

This section describes the procedure for checking pipettes with RFID tag.

- ▶ SmartScan™ is connected and configured.
 - ▶ The pipette has an RFID tag.
- 1 Hold the pipette in front of EasyScan™.
 - ⇒ EasyScan™ scans the data on the RFID tag and checks the calibration and Quick-Check dates.
 - ⇒ A message is displayed requesting whether any actions are required.
 - 2 If no actions are required, confirm with [OK].
 - ⇒ The check is complete.

14.2.2 Carrying out a Quick-Check

Navigation: [☰] > [Pipette Check]

Shown below is the procedure for carrying out a Quick-Check on pipettes with RFID tag.

Measurement steps

- Pipette as directed by the [HowTo] function key.
- Confirm with [OK].
- The balance performs a stabilization countdown.
- If activated, a beep sounds on completion of the measurement.

Carrying out a Quick-Check

- ▶ Application is activated.
- 1 Hold the pipette in front of EasyScan™.
 - ⇒ EasyScan™ scans and checks the data on the RFID tag.
 - ⇒ If the calibration date is due, this is displayed.
 - ⇒ If the date for the Quick-Check is due, start the Quick-Check.
 - 2 Press [Check].
 - ⇒ The balance starts the Quick-Check.
 - ⇒ A window with ambient data is displayed.
 - 3 Change the data if necessary and confirm with [OK]. (Once changed, the data is retained for subsequent Quick-Checks).
 - 4 Place the water container on the weighing pan and confirm with [OK].
 - ⇒ The balance displays the Quick-Check window.
 - 5 Carry out the measurements for the first volume.
 - If a measurement is carried out incorrectly, the last measurement can be cancelled or repeated 3 times per volume.
 - When **Auto start next sample** is active, start the next measurement directly with pipetting.
 - If **Auto start next sample** is not active, press [OK].

- ⇒ When the measurements for a volume are complete, the balance displays an appropriate message.
- 6 Tap [**Continue**] to continue with the next volume.
 - ⇒ The balance displays the result of the completed volume.
 - ⇒ The balance requests that the pipette is adjusted to the new volume and the next cycle started. Starting the cycle sets the balance to 0.
 - ⇒ Carry out the measurements as described.
- 7 When the measurements for the last volume are complete, the balance displays the overall statistics.
- 8 The test result can be printed by pressing .
- 9 If the Quick-Check is **PASSED**, hold the pipette in front of EasyScan™.
 - ⇒ The date of the next Quick-Check is written to the RFID tag.
- ⇒ Quick-Check is complete.

Note

Only the date of the next Quick-Check is written to the RFID tag. No Quick-Check results are recorded. The test results can be printed out at the end of the test.

14.2.3 Training

Navigation:  > [**Pipette Check**]

This section describes the training procedure. The training option can be used for pipette training or preparing for a complex or critical pipetting task.

Measurement steps

- Pipette as directed by the [**HowTo**] function key.
- Confirm with [**OK**].
- The balance performs a stabilization countdown.
- If activated, a beep sounds on completion of the measurement.

Training

- ▶ Application is activated.

- 1 Tap [**Training**].
 - ⇒ A window with test volume is displayed.
- 2 Change the data if necessary and confirm with [**OK**].
 - ⇒ A window with ambient data is displayed.
- 3 Change the data if necessary and confirm with [**OK**].
- 4 Place the liquid container on the weighing pan and confirm with [**OK**].
 - ⇒ A window with instructions is displayed.
- 5 Carried out the defined number of measurements.
 - If a measurement is carried out incorrectly, the last measurement can be cancelled or repeated any number of times.
 - When **Auto start next sample** is active, start the next measurement directly with pipetting.
 - If **Auto start next sample** is not active, press [**OK**].
- 6 The series of measurements is completed when the defined number is reached **No. of measurements**. To actively end the series of measurements, tap [**Finish**].
 - ⇒ The balance displays the final result.
- 7 The test result can be printed by pressing .
- 8 Confirm with [**OK**].
- ⇒ Training is complete.

14.2.4 Pipette configuration

14.2.4.1 Scanning a new pipette with RFID tag

Navigation:  > **[Pipette Check]**

This section describes the setting options for a new pipette. New RFID tags do not contain any data. Before the RFID tag can be used, the required data must be entered.

- ▶ Application is activated.
 - ▶ The RFID tag of the pipette is empty.
- 1 Hold the pipette in front of EasyScan™.
 - ⇒ The balance detects that the RFID tag is empty and opens the data input window.
 - 2 Enter the data.
 - 3 Confirm data entry with **[OK]**.
 - ⇒ The balance requests that the RFID pipette is held in front of EasyScan™.
 - 4 Hold the pipette in front of EasyScan™.
 - ⇒ The data is written to the RFID tag.
 - ⇒ The balance displays a message to confirm that the data has been successfully written to the tag.
 - 5 Confirm with **[OK]**.

The following data can be edited:

Parameters	Explanation	Values
Pipette SNR	Pipette serial number.	Alphanumeric, max. 15 characters*
Pipette model	Type of pipette.	Alphanumeric, max. 15 characters*
Nominal vol.	Nominal pipette volume in microliters [µl].	Value* (0)
Comment field: Name	Defines the free field name.	Alphanumeric, max. 10 characters*
Comment field: Content	Defines the free field content.	Alphanumeric, max. 15 characters
Next calibration	Defines the next calibration date.	Date* (Date plus 1 year)
Next QuickCheck	Defines the next Quick-Check date.	Date* (Date)
ISO class	Selects the pipette type (Single Channel or Multi Channel).	Selection field* (Single channel)
Evaporation trap	Defines whether an evaporation trap is required.	Selection field* (No)
No. of measurements	Defines the number of measurements for Quick-Check (valid for all volumes).	Value* (4)
Check intervall	Defines the Quick-Check interval (entry in days	Value* (90)
Volume 1	Defines the Quick-Check check volume 1 (percentage of the nominal volume).	Value* (10)
Volume 2	Defines the Quick-Check check volume 2 (percentage of the nominal volume).	Value* (100)
Volume 3	Defines the Quick-Check check volume 3 (percentage of the nominal volume).	Value* (0)

Sys. err. vol. 1 ...	Maximum permissible systematic error (tolerance limit) for Quick-Check check volumes 1 ... 3 (percentage of nominal volume).	Value* (0)
Sys. err. vol. 3		
Rand. err. vol. 1 ...	Maximum permissible random error (tolerance limit) for Quick-Check check volumes 1 ... 3 (percentage of nominal volume).	Value* (0)
Rand. err. vol. 3		

* Required field () application default values

Default values

The data of the last read or written pipette is displayed as default values. If no pipette was read or written since the start of the application, the application above default values are displayed.

These default values allow, e.g. a reference pipette to be used for the configuration of a new pipette.

- 1 Hold the reference pipette in front of EasyScan™.
 - ⇒ EasyScan™ reads the data and stores the default values.
- 2 Hold the pipette with empty RFID tag in front of EasyScan™.
 - ⇒ A data input window with the reference pipette default values is opened.

Check volume for Quick-Check

The Quick-Check can be carried out with 1 to 3 check volumes. A check volume of 0% means that this check volume is not used.

14.2.4.2 Editing pipette data

Navigation:  > [Pipette Check]

This section describes the procedure for editing the data of an RFID written pipette.

- ▶ Application is activated.
 - ▶ The pipette has an RFID tag.
- 1 Tap [**Setup**].
 - ⇒ The balance requests that the RFID pipette is held in front of EasyScan™.
 - 2 Hold the pipette in front of EasyScan™.
 - ⇒ EasyScan™ reads the data from the RFID-day and opens the data input window.
 - 3 Change the data in the respective data field.
 - 4 Confirm the changes with [**OK**].
 - ⇒ The balance requests that the RFID pipette is held in front of EasyScan™.
 - 5 Hold the pipette in front of EasyScan™.
 - ⇒ The data is written to the RFID tag.
 - ⇒ The balance displays a confirmation message.
 - 6 Confirm with [**OK**].

The following data can be edited:

See Scanning a new pipette with RFID tag (page 229).

14.2.5 Example protocol of a Quick-Check

The feasibility of a protocol depends on the selected protocol settings.

Example: Printout

```

---- METTLER TOLEDO ----
---- Pipette Check-----
25.Jul 2013          15:13
Balance type        XPE204
SNR                 12345678
Pipette model      ABC4711
Pipette SNR        87654321
Nominal vol.       100 µl
No. of measurements  4
Air press.         1013.0 hPa
Air temp.          20.0 C
Water temp.        20.0 C
Humidity           50.0 %
Con. factor Z      0.001003

Overall result      FAILED

Check vol.          10 µl

Error limit %E      1.0 %
Error limit %s      1.0 %

1:                  10.23 µl
2:                  10.04 µl
3:                   9.98 µl
4:                  10.19 µl

Average vol. x
                   10.11 µl
Sys.error E         0.11 µl
Sys. error %E       1.1 %
Random error s      0.11 µl
Random error %s    1.3 %
Uncertainty u       2.4 %
Result              FAILED

Overall result      FAILED

Signature

```

14.3 Calculations for Quick-Check

Formulae

For the calculation of volume, Z-factor and measurement uncertainty, formulae according to ISO 8655-6 and ISO/TR 20461 are used.

Rounding of values

- Values are rounded according to conventional rules ($\geq 5 \rightarrow$ rounded).
- Entered values, e.g. water temperature, air pressure, etc., are rounded to one decimal place.
- **Conv. factor Z** is rounded after calculation to 6 decimal places. This is used for conversion of weight to volume.
- The calculated volume is rounded to the resolution of the balance and shown in the protocol.
 - 6-place balance: Microliters with 3 decimal places
 - 5-place balance: Microliters with 2 decimal places
 - 4-place balance: Microliters with 1 decimal place

15 Titration Application

Navigation:  > [Titration]



This section contains information and setting options for practical working with the application.

All application settings are saved under the active user profile. Each user can select specific settings for this application. It must be ensured that the required user profile is selected.

The **Titration** application enables the automation of interaction between the balance and titrator. The optional EasyScan™ enables data to be read and written to an RFID tag. The RFID tag serves as a data carrier between the balance and titrator. The RFID tag placed on the base of a titrating beaker easily and reliably transfers the sample data, e.g. sample ID and weight.

The **Titration** application is based on the weighing application. For automated operation with a titrator, the **Titration** application has several settings and functions. Some settings and functions of the **Weighing** application do not apply here and have therefore been omitted. Only the settings and functions that differ from those of the **Weighing** application are described in detail below.

Selecting the application

- 1 Tap .
 - 2 Tap the [Titration] icon in the selection window.
 - ⇒ The selected application is active.
 - ⇒ Some of the specific titration function keys and information fields are activated by default (factory defaults).
- ⇒ The balance is ready for weighing.

15.1 Titration application settings

Navigation:  > [Titration] > 

Various specific titration settings are available, which can be used to adapt the application to suit specific requirements.

Most of the setting options are the same as for the **Weighing** application. Only the settings that differ are described below.

The arrow buttons can be used to page forward or back to a menu page.

The following parameters can be defined:

Menu item	Explanation	Further information
RFID Options	Defines the behavior of the application.	See Specific RFID option settings (page 232)
Identification	Activates/deactivates and names identification fields.	See Specific identifications for titration (page 233)
Function Keys	Defines the titration function keys to appear at the bottom of the display. These keys enable direct access to specific functions.	see Specific titration function keys (page 234)
Protocol	Selects information to be shown in the weighing protocols.	See Specific protocol information for titration (page 235)

15.1.1 Specific RFID option settings

Navigation:  > [Titration] >  > **RFID Options**

This menu item can be used to configure certain behavior patterns of the application.

- ▶ Application is activated.
- 1 Tap .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **RFID Options**, tap the **[Define]** button.
 - ⇒ A selection window is displayed.
- 3 Select the required menu item.
- 4 Tap **[On]**.
- 5 Confirm with **[OK]**.
- 6 To exit the menu item, tap **[OK]**.

The following parameters can be defined:

Parameters	Explanation	Values
Auto start data editing	Activates/deactivates automatic opening of the data editing window on detection of a new beaker. See Specific identifications for titration (page 233)	Off On*
Auto increment ID 1	Activates/deactivates automatic step-by-step incrementation of ID 1. See Specific identifications for titration (page 233).	Off* On
Auto print when writing	Activates/deactivates automatic printing when writing data to the RFID tag.	Off* On
RFID recognition beep	Activates/deactivates the RFID recognition beep. The beep sounds when the RFID reader has scanned the RFID tag data.	Off On*

* Factory setting

15.1.2 Specific identifications for titration

Navigation:  > **[Titration]** >  > **Identification**

The titration application provides (as with the **Weighing** application) 4 identifications. The available identifications have been adapted to the specific titration requirements.

Identifications can be configured here, i.e. named and activated/deactivated.

The following parameters can be defined:

Parameters	Explanation	Values
ID 1	Defines a designation (max. 20 characters). This field is prepared for use as a sample identifier (details below). In contrast to the other identifications, identification 1 cannot be deactivated (identification is essential for interaction with the titrator).	Name
ID 2	Activates/deactivates identification 2. Defines the designation (max. 20 characters).	Off On* Name
Corr. f.	Activates/deactivates the correction factor. Defines the designation (max. 20 characters). This numeric field is intended for entry of the correction factor to be used for titration.	Off On* Name

Density	Activates/deactivates the density. Defines the designation (max. 20 characters). This numeric field is intended for entry of the density to be used for titration.	Off On* Name
----------------	---	-------------------------

* Factory setting

Identification management

Once the identifications have been configured, they can be assigned a content. The field content can be edited with the **[Edit Data]** function key. When this function key is tapped, a window is displayed in which the values of the activated identifications can be edited (the name allocated in the configuration is displayed as a parameter).

The activated identifications are written to the RFID tag together with the determined sample weight, when the **[Write RFID]** function key is tapped.

The following rules apply to data entry:

Parameters	Values
ID1	Max. 20 alphanumeric characters
ID2	Max. 20 alphanumeric characters
Corr. f.	Numerical value, 0 ... 1000000.0000 (1.0)*
Density	Numerical value, 0 ... 100.0000 (1.0)*

* Factory setting

To automate the use of **ID 1** as a sample ID, the **Auto increment ID 1** option can be activated. If this option is selected, the field content of **ID 1** is incremented by 1 after each completed weighing (if the last character is not numerical, a digit is added).

See Specific RFID option settings (page 232).

The values of **Corr. f.** and **Density** are reset to the initial value 1.0 after each completed weighing. This prevents a once entered value from being unintentionally used for further samples.

If a larger number of samples are to be provided with the same correction factor and/or density, it is better and safer to enter this data in the respective titrator method.

Display as information fields

It is recommended to display (activated) identifications as information fields.

15.1.3 Specific titration function keys

Navigation:  > **[Titration]** >  > **Function Keys**

Function keys enable direct access to specific functions and settings in the application. A function can be activated by tapping a key.

The numbered function keys are displayed in the application at the bottom of the display. The numbers define the sequence in the display.

- Activate or deactivate function keys by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all function keys must be deactivated and subsequently activated in the required sequence.

The arrow buttons can be used to page forward or back to a menu page.

► Application is activated.

1 Press .

⇒ A window with application-dependent settings is displayed.

2 Under **Function Keys**, tap the **[Define]** button.

- 3 Select a function key by tapping.
 - ⇒ The function key is automatically numbered.
- 4 Change the settings and confirm with **[OK]**.
- 5 To restore the factory default settings, tap **[STD]**.
- 6 To exit the menu item, tap **[OK]**.

	Designation	Explanation
	Edit Data	Displays a window for editing identifications.
	Write RFID	Starts writing to the RFID tag.
	Read RFID	Reads the data to an RFID tag.

15.1.4 Specific protocol information for titration

Navigation:  > **[Titration]** >  > **Protocol**

Here you define which data appears in the protocols. This large menu item is divided into three sub-menus. They enable you to make additional settings for the application. The rest of the available protocol data corresponds to the data for the **Weighing** application and is not described here.

The numbered data items are printed in the protocols. The numbers determine the sequence in the printout.

- Information can be activated or deactivated by tapping. The sequence of the keys is automatically updated.
- To redefine the sequence, all information must be deactivated and subsequently activated in the required sequence.

► Application is activated.

- 1 Press .
 - ⇒ A window with application-dependent settings is displayed.
- 2 Under **Protocol**, tap the **[Define]** button.
 - ⇒ **Protocol** window is displayed.
- 3 Under (e.g. **Header**), tap the **[Define]** button.
- 4 Select an information key by tapping.
 - ⇒ The information key is automatically numbered.
- 5 To restore the factory default settings, tap **[STD]**.
- 6 To exit the menu item, tap **[OK]**.

The arrow buttons can be used to page forward or back to a menu page.

- A printer is connected and activated as an output device in the peripheral device settings.
- To print out the settings, press .

The following parameters can be defined:

Menu item	Explanation	Further information
Header	Define the information to be printed in the protocol header (before the results).	See Protocol header
Single value	Define the information to be recorded for each single result.	See Recording single values
Result	Define which statistical data is to be recorded.	See section Recording of results

Header line of protocols

Use this sub-menu to define which data is printed in the protocol header (before the results).

The following parameters can be defined:

Values	Explanation
ID 1	Records the defined identification.
ID 2	Records the defined identification.
Corr. f.	Records the correction factor.
Density	Records the density.

Factory setting: **Appl. Name** and **Date/Time** enabled in this order.

Recording of single values

The following parameters can be defined:

Values	Explanation
ID 1	Records the defined identification.
ID 2	Records the defined identification.
Corr. f.	Records the correction factor.
Density	Records the density.

Factory setting: **Net** enabled.

Protocol footer

This submenu can be used to define the information to be printed in the protocol footer after the results (single values).

The following parameters can be defined:

Values	Explanation
ID 1	Records the defined identification.
ID 2	Records the defined identification.
Corr. f.	Records the correction factor.
Density	Records the density.

Factory setting: **Signature** activated.

15.2 Working with the titration application

Navigation:  > [Titration]

This section describes working with the **Titration** application.

This application requires the use of the optional accessory SmartSample™. The supplied drip tray and weighing pan must be changed according to the enclosed assembly instructions.

Initial settings

To perform a weighing with RFID, at least 2 of the following function keys must be activated.



Edit Data

– Activate function keys.



Write RFID

Note

When the application is started, the [Write RFID] and [Read RFID] function keys (if displayed) are inactive and grayed.

Procedure

The procedure is very similar to the **Weighing** application. A brief description of the procedure and features of the **Titration** application is provided.

- ▶ Application is activated.
- ▶ SmartSample™ is connected and configured.
- 1 Place a beaker with RFID tag on the weighing pan.
 - ⇒ The balance checks the RFID type and activates the [**Read RFID**] function key (if displayed).
 - ⇒ If the **Auto start data editing** option is selected, an identification editing window is opened. Relevant data can be entered here
- 2 Tap [**→T←**].
 - ⇒ The balance is tared.
 - ⇒ The [**Write RFID**] function key is activated.
- 3 Place the sample in the beaker.
or
Remove the empty beaker from the weighing pan. Place the sample in the beaker. Place the beaker with the sample back on the weighing pan.
 - ⇒ The balance displays the sample weight.
- 4 Press [**Write RFID**] to write the data (activated identifications and weight) to the RFID tag of the beaker.
 - ⇒ The balance waits for a stable weight display.
 - ⇒ The data is written to the RFID tag of the beaker. If the **Auto print when writing** option is activated, the data is simultaneously printed on the printer (if a printer is connected).
 - ⇒ The balance displays a message confirming that the data has been successfully written (all written data is also displayed).
- 5 Remove the beaker from the weighing pan.
 - ⇒ The [**Read RFID**] and [**Write RFID**] function keys (if displayed) are inactive and grayed.
 - ⇒ Weighing is complete.
 - The **Corr. f.** and **Density** fields are reset to 1.0.
 - If the **Auto increment ID 1** option is activated, **ID 1** is incremented by 1.

Identifications can be edited at any time during this procedure (preferably before writing data to the RFID tag) with the **Edit Data** function key.

16 Maintenance

16.1 Cleaning

Periodically clean the weighing pan, the drip tray, the housing, and the terminal of your balance using the brush supplied with it. The maintenance interval depends on your standard operating procedure (SOP).

Please observe the following notes:



WARNING

Risk of electric shock

- a) Disconnect the balance from the power supply prior to cleaning and maintenance.
- b) Only use METTLER TOLEDO power cords, if these need to be replaced.
- c) Ensure that no liquid comes into contact with the balance, terminal or AC adapter.
- d) Do not open the balance, terminal or AC adapter.
These contain no user-serviceable parts.



CAUTION

Damage to balance

Under no circumstances use cleaning agents containing solvents or abrasive agents, as this can damage the terminal overlay.

Cleaning

Your balance is made from high quality, resistant materials and can therefore be cleaned with a commercially available, mild cleaning agent.

- 1 To clean the weighing chamber thoroughly, move the draft shield glass panels (including intermediate shelf) away from the balance and remove them from their fastenings.
- 2 Carefully lift the front of the weighing pan and lift it out of the guide.
- 3 Remove the drip tray from the balance.
- 4 Ensure that these parts are correctly positioned when refitted.

Note

Contact a METTLER TOLEDO representative to find about the service options available – regular maintenance by an authorized service engineer will ensure consistent weighing accuracy over the long term and extend the service life of the balance.

16.2 Disposal

In conformance with the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) this device may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements.



Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment. If you have any questions, please contact the responsible authority or the distributor from which you purchased this device. Should this device be passed on to other parties (for private or professional use), the content of this regulation must also be related.

Thank you for your contribution to environmental protection.

16.3 Firmware (Software) Updates

METTLER TOLEDO is continuously improving its balance firmware (software) for the benefit of customers. So that the customer can benefit quickly and easily from further developments, METTLER TOLEDO makes the latest firmware versions available on the Internet. The firmware made available on the Internet has been developed and tested by Mettler-Toledo AG using processes that meet the guidelines of ISO 9001. Mettler-Toledo AG does not, however, accept liability for consequences that may arise from using the firmware.

16.3.1 How it Works

For important balance information and updates, visit METTLER TOLEDO at:

www.mettler-toledo-support.com

A program called **e-Loader II** will be downloaded together with the firmware update to your computer. This program can be used to transfer the firmware to the balance. Before transferring a firmware update to the balance, all balance settings can be backed up with **e-Loader II**.

If the selected update should include an application not described in these instructions (or one that has been updated in the meantime), the corresponding instructions can also be downloaded in Adobe Acrobat® PDF format.

Note

New applications may not be visible until the type data has been updated by a service engineer.

Requirements

Minimum requirements for downloading applications from the Internet and installing them on the balance are as follows:

- PC with one of the following Microsoft Windows® operating system:
 - Microsoft® Windows® XP Home or Professional with Service Pack 3 (32 bit).
 - Microsoft® Windows Vista® Home Premium, Business, Ultimate or Enterprise with Service Pack 2 (32 bit and 64 bit).
 - Microsoft® Windows 7 with Service Pack 1 Home Premium, Professional, Ultimate or Enterprise (32 bit and 64 bit).
- Internet connection and web browser (e.g. Internet Explorer).
- Connecting cable between PC and balance (e.g. No. 11101051 see section Accessories).

16.3.2 Update Procedure

Installing the e-Loader II software downloaded from the Internet on your PC.

- 1 Establish a connection to the Internet.
- 2 Visit <http://www.mettler-toledo-support.com>.
- 3 Enter the required registration information on the METTLER TOLEDO Balance Support Site.
- 4 Click on the **Customer Support** link and login.
- 5 Click on your balance model.
- 6 Click on the required firmware version and install it.

Transferring the new firmware to the balance

- Start **e-Loader II** and follow the instructions, which will provide a step-by-step guide through the installation.

Important

- Perform a **Master Reset** after the firmware update.

17 Troubleshooting

17.1 Error messages

The majority of error messages are displayed in plain text in the respective application accompanied by remedial instructions. Error messages of this type are self-explanatory and therefore are not mentioned below. The following error messages can be displayed instead of the weighing result.

Error message	Cause	Remedy
Weight display		
	Overload – the applied weight exceeds the weighing capacity of the balance.	– Reduce the sample weight.
	Underload – sample pan holder is missing.	– Check that the weighing pan is positioned correctly, moves freely and does not scrape against the draft cover.
	Weight display flashes/Out of zero range – when one or several range limits are exceeded when the balance is switched on or zeroed. This message is always displayed when a weight is present in the weighing pan when the balance is switched on.	– Remove the weight.
Timeout	Taring or zeroing was aborted due to a lack of stability.	<ol style="list-style-type: none"> 1 Close the draft shield doors and check the location (draft, vibrations). 2 Confirm with [OK]. 3 Repeat the procedure.
Error message	Cause	Remedy
Data could not be read from RFID tag. RFID unit not responding!	RFID unit failed to respond and was timed out. RFID unit incorrectly connected or configured.	<ol style="list-style-type: none"> 1 Check that the RFID unit is correctly connected. 2 Check the RFID configuration
Data could not be written to RFID tag. RFID unit not responding!	See above	See above
Data could not be read from RFID tag. RFID error	Hardware problem	– Use a different RFID tag.
Data could not be written to RFID tag. RFID error	See above	See above
RFID tag is not compatible with this application	RFID tag contains data of other applications, e.g. pipette check.	– Use a different RFID tag.
No RFID tag detected.	RFID tag removed from balance during read operation	– Place the beaker with the RFID tag on the balance again.
	RFID tag removed from balance during write operation	See above

For RFID configuration, **see** Pipette configuration (page 229).

Other error messages

If error messages are displayed other than those described above ("Error x"), contact a METTLER TOLEDO representative.

17.2 Status messages/Status icons

	Cause	Remedy
	Automatic ProFACT Adjustment is currently not possible as the balance is busy.	<ol style="list-style-type: none"> 1 Unload the balance. 2 Do not select any key for 2 minutes. The display stabilizes. ⇒ The status icon extinguishes after successful adjustment.
	A request for automatic adjustment with an external weight was defined in the system settings.	<ul style="list-style-type: none"> – Carry out the adjustment. ⇒ The status icon extinguishes after successful adjustment or if adjustment is declined.
	A request for automatic testing of the adjustment with an external weight was defined in the system settings.	<ul style="list-style-type: none"> – Carry out the test. ⇒ The status icon extinguishes after a successful test or if the test is declined.
	The MinWeigh function is active. This indicates that the minimum weight for the current tare was not yet reached.	<ul style="list-style-type: none"> – Ensure that the minimum weight is reached. ⇒ The status icon extinguishes.
	The next test for the MinWeigh function is due.	<ul style="list-style-type: none"> – Contact a METTLER TOLEDO representative as soon as possible. ⇒ A service engineer will carry out the test as soon as possible.
	The balance battery must be replaced. This battery ensures that the date and time are retained when the balance is disconnected from the power supply.	<ul style="list-style-type: none"> – Contact a METTLER TOLEDO representative as soon as possible. ⇒ The battery can be replaced by a service engineer.
	The balance is due for a service .	<ul style="list-style-type: none"> – Contact a METTLER TOLEDO representative as soon as possible. ⇒ The balance can be serviced by a service engineer.
	The built-in level sensor has detected that the balance is not correctly leveled.	<ul style="list-style-type: none"> – Immediately level the balance. ⇒ The status icon extinguishes as soon as the balance is correctly leveled.
GWP	A request for automatic performance of a task was defined in the system settings.	<ul style="list-style-type: none"> – Carry out the task. ⇒ The status icon extinguishes after the task is carried out.

	<p>The Antistatic Kit is active, i.e. the ionizer is on.</p> <p>This icon only indicates that the Antistatic Kit is active, however this does not mean that the Antistatic Kit is actually switched on and ready to use.</p>	<ul style="list-style-type: none"> ▶ The control cable of the Antistatic Kit is connected to the balance and the balance is connected to the power supply and switched on. – For zeroing, taring and adjustment, the ionizer is deactivated and the status icon extinguishes as the ionizer could disturb these operations. When these operations have been completed, tap the [Ionizer] function key to activate the ionizer again.
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17.3 What to do if....?

Symptom	Countermeasure
Display remains dark after switching on	<ul style="list-style-type: none"> • It must be ensured that the terminal is correctly connected to the balance. • Ensure that the balance is connected to the power supply and switched on. • If the problem persists, contact a METTLER TOLEDO representative.
Keys and buttons do not respond	<ul style="list-style-type: none"> • Reboot the system by disconnecting and reconnecting it to the power supply. • If the problem persists, contact a METTLER TOLEDO representative.
The connected printer does not print	<ul style="list-style-type: none"> • Ensure that the printer is switched on and activated in the menu. See Peripherals. • Check the printer settings. See Recommended printer settings (page 264).
Incorrect characters are printed	<ul style="list-style-type: none"> • Change the bit/parity settings of the printer and balance to 8/No. • Check that both devices have the same baud rate setting. See Peripherals. • Use the appropriate character sets. See Recommended printer settings (page 264).

18 Technical Data

18.1 General data



CAUTION

Only use an approved AC adapter with a current-limited SELV output.
Ensure correct polarity \ominus — \oplus

Power supply

AC adapter:	Primary: 100 – 240 V AC, -15%/+10%, 50/60 Hz Secondary: 12 V DC \pm 3%, 2.5 A (with electronic overload protection)
Cable for AC adapter:	3-core, with country-specific plug
Balance power supply:	12 V DC \pm 3%, 2.25 A, maximum ripple: 80 mVpp

Protection and standards

Overvoltage category:	II
Degree of pollution:	2
Protection:	Protected against dust and water
Standards for safety and EMC:	See Declaration of Conformity
Range of application:	For use only in closed interior rooms

Environmental conditions

Height above mean sea level:	Up to 4000 m
Ambient temperature:	5–40 °C
Relative air humidity:	Max. 80% up to 31 °C, linearly decreasing to 50% at 40 °C, noncondensing
Warm-up time:	At least 120 minutes after connecting the balance to the power supply; when switched on from standby-mode, the balance is ready for operation immediately

Materials

Housing:	Die-cast aluminum, plastic, chrome steel and glass
Terminal:	Die-cast zinc, chromed and plastics
SmartGrid:	Chrome-nickel steel X5CrNi18-10

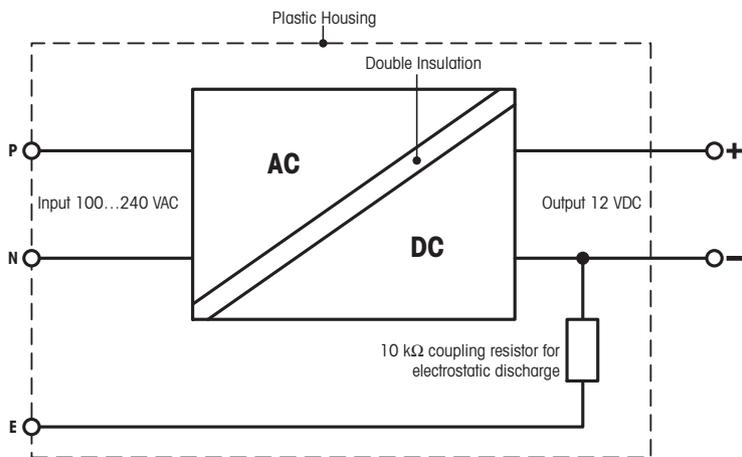
18.2 Explanatory notes for the METTLER TOLEDO AC adapter

The certified external power supply which conforms to the requirements for Class II double insulated equipment is not provided with a protective earth connection but with a functional earth connection for EMC purposes. This earth connection IS NOT a safety feature. Further information about conformance of our products can be found in the brochure "Declaration of Conformity" which is coming with each product.

In case of testing with regard to the European Directive 2001/95/EC the power supply and the balance have to be handled as Class II double insulated equipment.

Consequently an earth bonding test is not required. Similarly it is not necessary to carry out an earth bonding test between the supply earth conductor and any exposed metalwork on the balance.

Because the balance are sensitive to static charges a leakage resistor, typically 10 k Ω , is connected between the earth connector and the power supply output terminals. The arrangement is shown in the equivalent circuit diagram. This resistor is not part of the electrical safety arrangement and does not require testing at regular intervals.



Equivalent circuit diagram

18.3 Model-specific data

		XPE105	XPE205	XPE205DR
Limit values				
Maximum capacity		120 g	220 g	220 g
Readability		0.01 mg	0.01 mg	0.1 mg
Tare range (from...to)		0 ... 120 g	0 ... 220 g	0 ... 220 g
Maximum capacity in fine range		–	–	81 g
Readability in fine range		–	–	0.01 mg
Repeatability (at nominal load)	sd	0.03 mg (100 g)	0.03 mg (200 g)	0.06 mg (200 g)
Repeatability (at low load)	sd	0.015 mg (10 g)	0.015 mg (10 g)	0.05 mg (10 g)
Repeatability in fine range (at low load)	sd	–	–	0.015 mg (10 g)
Linearity deviation		0.1 mg	0.1 mg	0.15 mg
Eccentric deviation (test load) ¹⁾		0.12 mg (50 g)	0.2 mg (100 g)	0.25 mg (100 g)
Sensitivity offset (test weight)		0.3 mg (100 g)	0.5 mg (200 g)	0.5 mg (200 g)
Sensitivity temperature drift ²⁾		0.0001%/°C	0.0001%/°C	0.0001%/°C
Sensitivity stability ³⁾		0.0001%/a	0.0001%/a	0.0001%/a
Typical values				
Repeatability (at low load)	sd	0.007 mg (5 g)	0.007 mg (10 g)	–
Repeatability in fine range	sd	–	–	0.007 mg (10 g)
Linearity deviation		0.065 mg	0.065 mg	0.1 mg
Eccentric deviation (test load) ¹⁾		0.065 mg (50 g)	0.1 mg (100 g)	0.1 mg (100 g)
Sensitivity offset (test weight)		0.15 mg (100 g)	0.2 mg (200 g)	0.32 mg (200 g)
Minimum weight (according to USP)		14 mg	14 mg	80 mg
Minimum weight (according to USP) in fine range		–	–	14 mg
Minimum weight (U=1%, k=2)		1.4 mg	1.4 mg	8 mg
Minimum weight (U=1%, k=2) in fine range		–	–	1.4 mg
Setting time		2.5 s	2.5 s	1.5 s
Setting time in fine range		–	–	2.5 s
Dimensions				
Balance dimensions (W × D × H)		263 × 493 × 322 mm	263 × 493 × 322 mm	263 × 493 × 322 mm
Weighing pan dimensions		78 × 73 mm (W × D)	78 × 73 mm (W × D)	78 × 73 mm (W × D)
Typical uncertainties and supplementary data				
Repeatability	sd	0.007 mg + 0.000012%·Rgr	0.007 mg + 0.000006%·Rgr	0.04 mg + 0.000005%·Rgr
Repeatability in fine range	sd	–	–	0.007 mg + 0.000012%·Rgr
Differential linearity deviation	sd	√(10 pg·Rnt)	√(5pg·Rnt)	√(12pg·Rnt)
Differential eccentric load deviation	sd	0.00008%·Rnt	0.00006%·Rnt	0.00008%·Rnt
Sensitivity offset	sd	0.00006%·Rnt	0.00006%·Rnt	0.00006%·Rnt
Minimum weight (according to USP)		14 mg + 0.024%·Rgr	14 mg + 0.012%·Rgr	80 mg + 0.01%·Rgr

	XPE105	XPE205	XPE205DR
Minimum weight (according to USP) in fine range	–	–	14 mg + 0.024%·Rgr
Minimum weight (U=1%, k=2)	1.4 mg + 0.0024%·Rgr	1.4 mg + 0.0012%·Rgr	8 mg + 0.001%·Rgr
Minimum weight (U=1%, k=2) in fine range	–	–	1.4 mg + 0.0024%·Rgr
Weighing time	4 s	6 s	4 s
Weighing time in fine range	–	–	6 s
Interface update rate	23/s	23/s	23/s
Usable height of draft shield	235 mm	235 mm	235 mm
Weight of balance	10.4 kg	10.4 kg	10.4 kg
Number of built-in reference weights	2	2	2
Weights for routine testing			
OIML CarePac	100 g F2, 5 g E2	200 g F2, 10 g F1	200 g F2, 10 g F1
Weights	#11123002	#11123001	#11123001
ASTM CarePac	100 g 1, 5 g 1	200 g 1, 10 g 1	200 g 1, 10 g 1
Weights	#11123102	#11123101	#11123101

sd = Standard deviation

Rnt = Net weight (sample weight)

Rgr = Gross weight

a = Year (annum)

¹⁾ Valid for compact objects

²⁾ After adjustment with built-in reference weight

³⁾ On DeltaRange models: fine range starts at zero load (gross)

		XPE204	XPE504
Limit values			
Maximum capacity		220 g	520 g
Readability		0.1 mg	0.1 mg
Tare range (from...to)		0 ... 220 g	0 ... 520 g
Maximum capacity in fine range		–	–
Readability in fine range		–	–
Repeatability (at nominal load)	sd	0.07 mg (200 g)	0.12 mg (500 g)
Repeatability (at low load)	sd	0.05 mg (10 g)	0.08 mg (10 g)
Repeatability in fine range (at low load)	sd	–	–
Linearity deviation		0.2 mg	0.4 mg
Eccentric deviation (test load) ¹⁾		0.25 mg (100 g)	0.4 mg (200 g)
Sensitivity offset (test weight)		0.6 mg (200 g)	1.5 mg (500 g)
Sensitivity temperature drift ²⁾		0.0001%/°C	0.0001%/°C
Sensitivity stability ³⁾		0.0001%/a	0.0001%/a
Typical values			
Repeatability (at low load)	sd	0.04 mg (10 g)	0.04 mg (10 g)
Repeatability in fine range	sd	–	–
Linearity deviation		0.13 mg	0.32 mg
Eccentric deviation (test load) ¹⁾		0.12 mg (100 g)	0.2 mg (200 g)
Sensitivity offset (test weight)		0.4 mg (200 g)	0.6 mg (500 g)
Minimum weight (according to USP)		80 mg	80 mg
Minimum weight (according to USP) in fine range		–	–
Minimum weight (U=1%, k=2)		8 mg	8 mg
Minimum weight (U=1%, k=2) in fine range		–	–
Setting time		1.5 s	1.5 s
Setting time in fine range		–	–
Dimensions			
Balance dimensions (W × D × H)		263 × 493 × 322 mm	263 × 493 × 322 mm
Weighing pan dimensions		78 × 73 mm (W × D)	78 × 73 mm (W × D)
Typical uncertainties and supplementary data			
Repeatability	sd	0.04 mg + 0.00001%·Rgr	0.04 mg + 0.000008%·Rgr
Repeatability in fine range	sd	–	–
Differential linearity deviation	sd	√(20 pg·Rnt)	√(50 pg·Rnt)
Differential eccentric load deviation	sd	0.00008%·Rnt	0.00006%·Rnt

		XPE204	XPE504
Sensitivity offset	sd	$0.00006\% \cdot Rnt$	$0.00006\% \cdot Rnt$
Minimum weight (according to USP)		$80 \text{ mg} + 0.02\% \cdot Rgr$	$80 \text{ mg} + 0.016\% \cdot Rgr$
Minimum weight (according to USP) in fine range		–	–
Minimum weight (U=1%, k=2)		$8 \text{ mg} + 0.002\% \cdot Rgr$	$8 \text{ mg} + 0.0016\% \cdot Rgr$
Minimum weight (U=1%, k=2) in fine range		–	–
Weighing time		4 s	4 s
Weighing time in fine range		–	–
Interface update rate		23/s	23/s
Usable height of draft shield		235 mm	235 mm
Weight of balance		10.4 kg	10.4 kg
Number of built-in reference weights		2	2
Weights for routine testing			
OIML CarePac		200 g F2, 10 g F1	500 g F2, 20 g F1
	Weights	#11123001	#11123007
ASTM CarePac		200 g 1, 10 g 1	500 g 1, 20 g 1
	Weights	#11123101	#11123107

sd = Standard deviation

Rgr = Gross weight

1) Valid for compact objects

3) On DeltaRange models: fine range starts at zero load (gross)

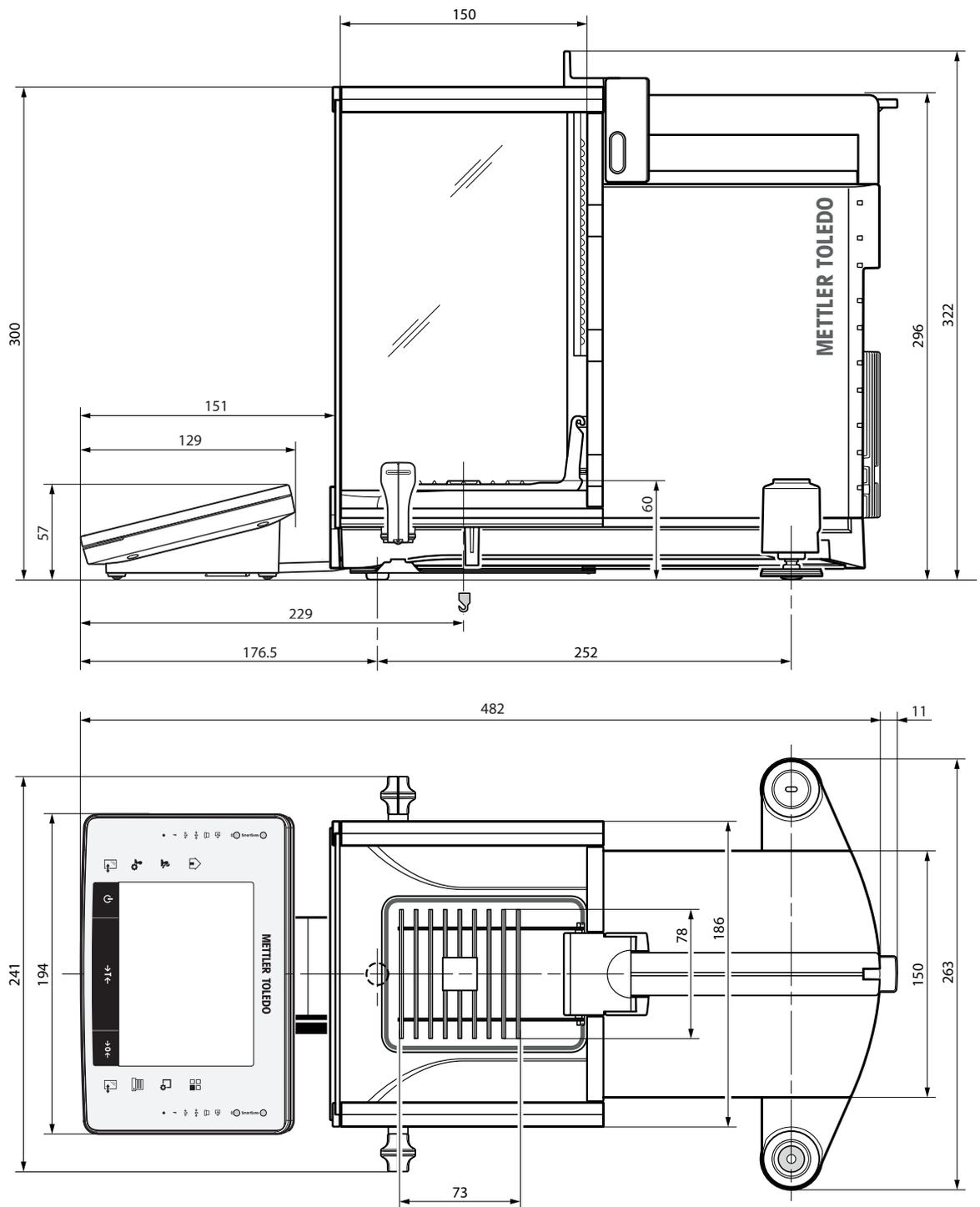
Rnt = Net weight (sample weight)

a = Year (annum)

2) After adjustment with built-in reference weight

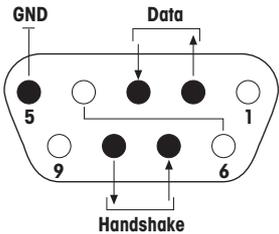
18.4 Dimensions

Dimensions in mm.



18.5 Interfaces

18.5.1 Specifications of RS232C

Interface type:	Voltage interface according to EIA RS-232C/DIN 66020 (CCITT V24/V.28)	
Max. cable length:	15 m	
Signal level:	Outputs: +5 V ... +15 V (RL = 3 – 7 kΩ) –5 V ... –15 V (RL = 3 – 7 kΩ)	Inputs: +3 V ... 25 V –3 V ... 25 V
Connector:	Sub-D, 9-pole, female	
Operating mode:	Full duplex	
Transmission mode:	Bit-serial, asynchronous	
Transmission code:	ASCII	
Baud rates:	600, 1200, 2400, 4800, 9600, 19200, 38400 ¹⁾ (firmware selectable)	
Bits/parity:	7-bit/even, 7-bit/odd, 7-bit/none, 8-bit/none (firmware selectable)	
Stop bits:	1 stop bit	
Handshake:	None, XON/XOFF, RTS/CTS (firmware selectable)	
End-of-line:	<CR><LF>, <CR>, <LF> (firmware selectable)	
	Pin 2: Balance transmit line (TxD) Pin 3: Balance receive line (RxD) Pin 5: Ground signal (GND) Pin 7: Clear to send (hardware handshake) (CTS) Pin 8: Request to send (hardware handshake) (RTS)	

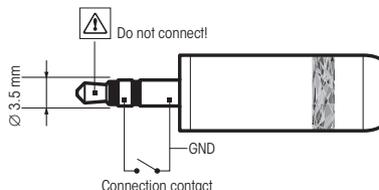
- ¹⁾ 38400 baud is only possible in special cases, such as:
- Weighing platform without terminal, or
 - Weighing platform with terminal, only via the optional RS232C interface.

18.5.2 Specifications of "Aux" connection

You can connect the METTLER TOLEDO "ErgoSens" or an external switch to sockets "Aux 1" and "Aux 2". This allows you to start functions such as taring, zeroing, printing and others.

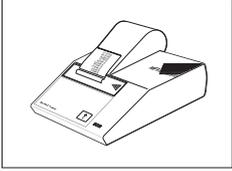
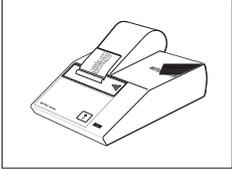
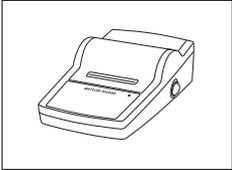
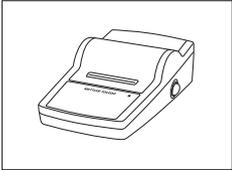
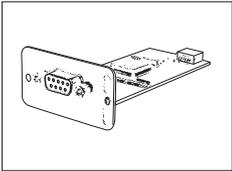
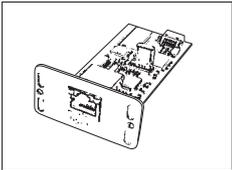
External connection

Connector: 3.5 mm stereo jack connector
Electrical data: Max. voltage 12 V
Max. current 150 mA



19 Accessories and Spare Parts

19.1 Accessories

	Description	Part No.
Printers		
	BT-P42 printer with Bluetooth connection to instrument	11132540
	Paper roll, set of 5 pcs	00072456
	Paper roll, self-adhesive, set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
	RS-P42 printer with RS232C connection to instrument	00229265
	Paper roll, set of 5 pcs	00072456
	Paper roll, self-adhesive, set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
	RS-P25 printer with RS232C connection to instrument	11124300
	Paper roll, set of 5 pcs	00072456
	Paper roll, self-adhesive, set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
	RS-P26 printer with RS232C connection to instrument (with date and time)	11124303
	Paper roll, set of 5 pcs	00072456
	Paper roll, self-adhesive, set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
	LC-P45 application printer with additional functions	00229119
	Paper roll, set of 5 pcs	00072456
	Paper roll, self-adhesive, set of 3 pcs	11600388
	Ribbon cartridge, black, set of 2 pcs	00065975
Optional interfaces		
	Second RS232C Interface	11132500
	Ethernet Interface for connection to an Ethernet network	11132515



BT option: Bluetooth Interface for multipoint connection for up to 6 Bluetooth devices

11132530



BTS option: Bluetooth Interface, single-point connection

11132535



PS/2 option: Interface for connecting commercial keyboards and barcode readers

11132520



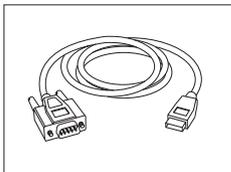
LocalCAN option: Interface for connection of up to 5 LC (LocalCAN) instruments

11132505



MiniMettler option: Interface MiniMettler, for connection to older (legacy) METTLER TOLEDO systems

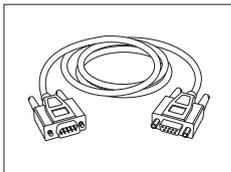
11132510



RS232 - USB converter cable – Cable with converter to connect a balance (RS232) to a USB port

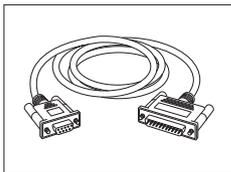
64088427

Cables for RS232C interface



RS9 – RS9 (m/f): connection cable for PC, length = 1 m

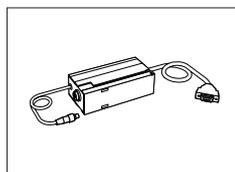
11101051



RS9 – RS25 (m/f): connection cable for PC, length = 2 m

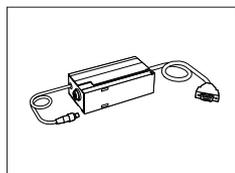
11101052

Cables for LocalCAN interface



LC – RS9: Cable for connecting a PC with RS232C, 9-pin (f), length = 2 m

00229065



LC – RS25: Cable for connecting a printer or PC with RS232C, 25-pin (m/f), length = 2 m

00229050



LC – CL: Cable for connecting a device with METTLER TOLEDO CL interface (5-pin), length = 2 m

00229130



LC – LC2: Extension cable for LocalCAN, length = 2 m

00229115



LC – LC5: Extension cable for LocalCAN, length = 5 m

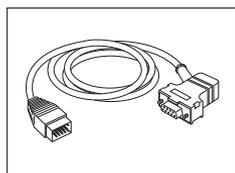
00229116



LC – LCT: Cable branch (T-connector) for LocalCAN

00229118

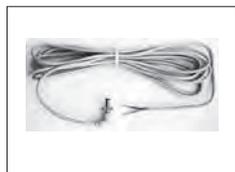
Cables for MiniMettler interface



MM – RS9f: RS232C connection cable to MiniMettler interface, length = 1.5 m

00229029

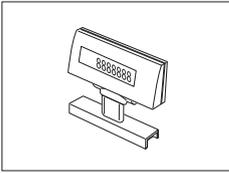
Cable, one-sided open (2-pin)



Cable between balance and AC adapter, length = 4 m

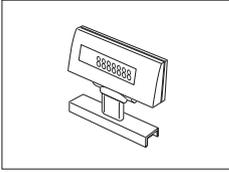
11132037

Auxiliary displays



BT-BLD Bluetooth auxiliary display for table mounting, 168 mm, LCD display with backlighting

11132555



LC/RS-BLD auxiliary display on bench stand, backlit (incl. RS cable and separate AC adapter)

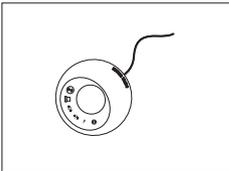
00224200



RS/LC-BLDS auxiliary display for table or balance mounting, 480 mm, LCD display with backlighting

11132630

Sensors



ErgoSens, optical sensor for hands-free operation

11132601

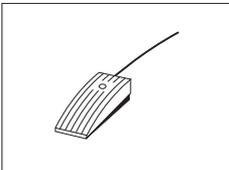
LC-Switchbox



For connection of up to 3 balances with LocalCAN interface to a printer

00229220

Footswitches



Footswitch with selectable function for balances (Aux 1, Aux 2)

11106741



LC-FS foot switch with selectable function for balances with LocalCAN interface

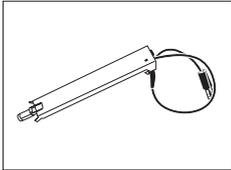
00229060

Filling-process control

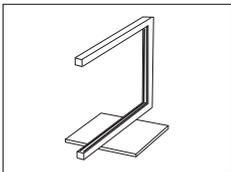


LV11 automatic feeder for automatic loading of small items on the balance	21900608
LV11 Draft shield door	11106715
SQC14 filling process control	
Compact instrument with printer for control of up to 16 articles	00236210
Compact instrument with printer for control of up to 60 articles	00236211

AntiStatic kit



Compact Antistatic Kit. Eliminates the build-up of electrostatic charges on containers and samples.	30090337
Note For the operation of 2 compact Antistatic Kits, an additional AC adapter can be ordered, see Various accessories.	



Universal AntiStatic Kit complete (U-shaped), including electrode and power supply	11107767
Optional: Second U-electrode* for universal AntiStatic Kit	11107764
* Power supply for optional, second U-elektrode (11107764)	11107766

ErgoClips

Weighing kit for various weighing containers



ErgoClip Weighing kit	11106707
Delivery: 3 ErgoClips for Round-Bottom Flask, Weighing Boat and Tube, 20 Weighing Boat, 10 Single-use aluminium weighing pans.	



ErgoClip "Basket"	11106747
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ErgoClip "Titration Basket"	11106883
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ErgoClip "Weighing Boat"	11106748
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ErgoClip "Round-Bottom Flask"

11106746



ErgoClip "small Flask"

11140180



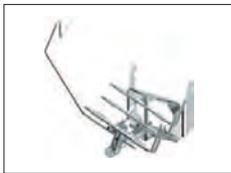
ErgoClip "Filter holder"

11140185



ErgoClip "Stand"

11140170



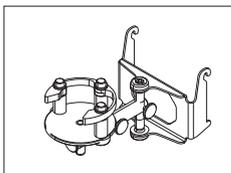
ErgoClip "Flask"

11106764



ErgoClip "Tube"

11106784



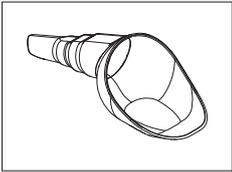
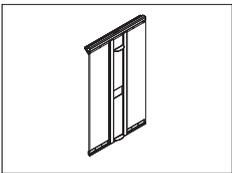
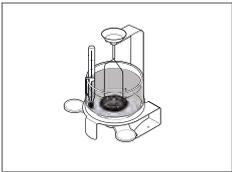
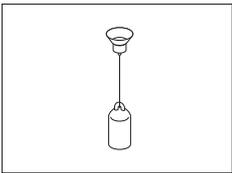
ErgoClip for Quantos

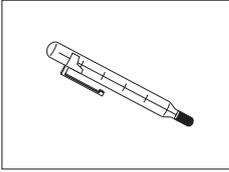
11141570



ErgoClip Syringe

30008288

	Single-use aluminium weighing pans, 10 units	11106711
	SmardGrid cover, chromium-nickel steel	11106709
	SmartPrep™, single-use funnel for quick and easy sample preparation. For flask sizes 10/19, 12/21, 14/23. 50 pcs	30061260
	Grey drip tray	30038741
	MinWeigh door	11106749
Filter kit		
	Filter kit for, until 110 mm	11140000
Density determination		
	Density kit	11106706
	Sinker for density of liquids in conjunction with Density Kit Calibrated (sinker + certificate) Recalibrated (new certificate)	00210260 00210672 00210674



Calibrated thermometer with certificate

11132685

Pipette calibration



Evaporation Trap, incl. adapter

11140043



Evaporation Trap large

11138440



1-channel suction pump complete
Hose 2 m for suction pump

11138268

11138132



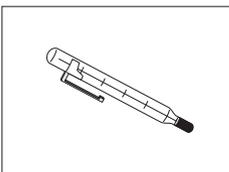
Reagent reservoirs, 5 pcs.

11600616



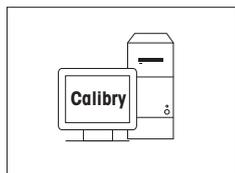
Barometer

11600086



Precision thermometer with clip, not certified

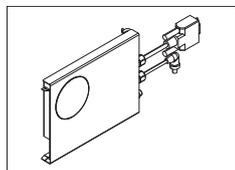
00238767



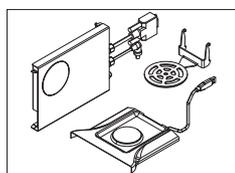
Calibry PC Software

Calibry Light; for single channel pipettes	11138423
Update	30007342
Calibry Single workstation; for calibration with one system MPC	11138419
Update	30007340
Calibry Network; Installation on several PC of the network accessing the same database	11138420
Update	30007341
Calibry Validation manual	11780959

RFID reader



EasyScan™, accessory for pipette check application. Reads and writes RFID tags (radio frequency identification). 30078900



SmartSample™, accessory for titration application for transferring sample information from the balance to the titrator. Reads and writes RFID tags (radio frequency identification). The kit includes:

- EasyScan™
- SmartSample™ drip tray
- SmartSample™ SmartGrid

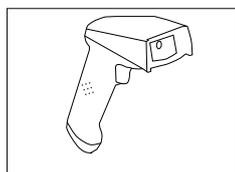
30078901



Smart Tag

Set of 50 pieces	30101517
Set of 200 pieces	30101518

Barcode reader



RS232C Barcode Reader

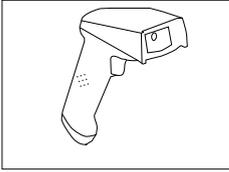
21901297

The following accessories are needed for operation (not included):

RS232 F cable	21901305
Null modem adapter	21900924
AC adapter 5 V for EU	21901370
AC adapter 5 V for US	21901372
AC adapter 5 V for GB	21901371
AC adapter 5 V for AU	21901370

Plus one of the following:

+ 71209966



RS232C Barcode Reader – Cordless

21901299

The following accessories are needed for operation (not included):

Cradle 21901300

RS232 F cable 21901305

Null modem adapter 21900924

Plus one of the following:

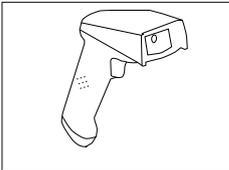
AC adapter 12 V for EU 21901373

AC adapter 12 V for US 21901375

AC adapter 12 V for GB 21901374

AC adapter 12 V for AU 21901373

+ 71209966

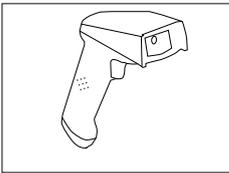


PS/2 Barcode Reader, without cable

21901297

PS/2 wedge single cable

21901307



PS/2Y Barcode Reader, without cable

21901297

PS/2 wedge twin (Y) cable

21901308

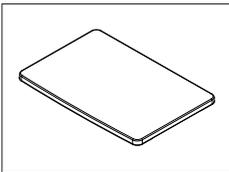
Anti-theft devices



Steel cable

11600361

Protective covers



Protective cover for terminal

30059776

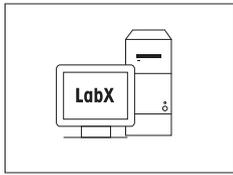
Dust covers



Dust cover

30035838

Software

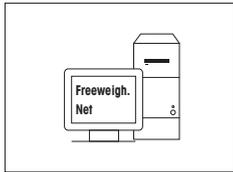


LabX software for one click™ weighing solutions

on request

Enables you to perform One Click™ Standard Preparation, One Click™ Loss on Drying, One Click™ Sieve Analysis and many other applications.

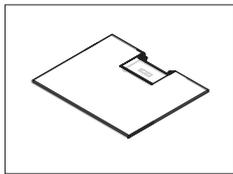
Simply start the method with the One Click™ shortcut on the balance touchscreen. LabX guides you step-by-step through the SOP on the balance, performs your calculations automatically, and takes care of saving all your data. The complete solution can be tailored to match your process requirements. Visit www.mt.com/one-click-weighing for more information



Freeweigh.Net

21900895

Various



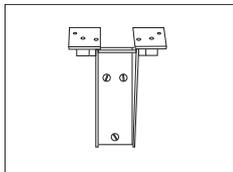
Intermediate shelf

30096753



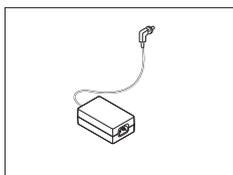
Terminal and printer stand, mounting on balance

11106730



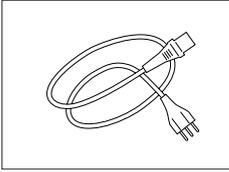
Wall fixture for terminal

11132665



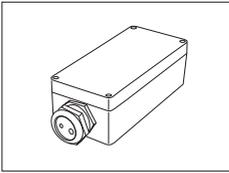
AC/DC adapter (without power cable) 100–240 V AC, 0.8 A, 50/60 Hz, 12 V DC 2.5 A

11107909



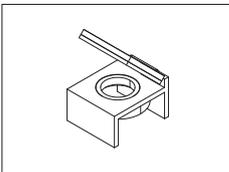
Country-specific 3-Pin power cable with grounding conductor.

Power cable AU	00088751
Power cable BR	30015268
Power cable CH	00087920
Power cable CN	30047293
Power cable DK	00087452
Power cable EU	00087925
Power cable GB	00089405
Power cable IL	00225297
Power cable IN	11600569
Power cable IT	00087457
Power cable JP	11107881
Power cable TH, PE	11107880
Power cable US	00088668
Power cable ZA	00089728



IP54 protective housing for AC adapter

11132550



Level bubble mirror

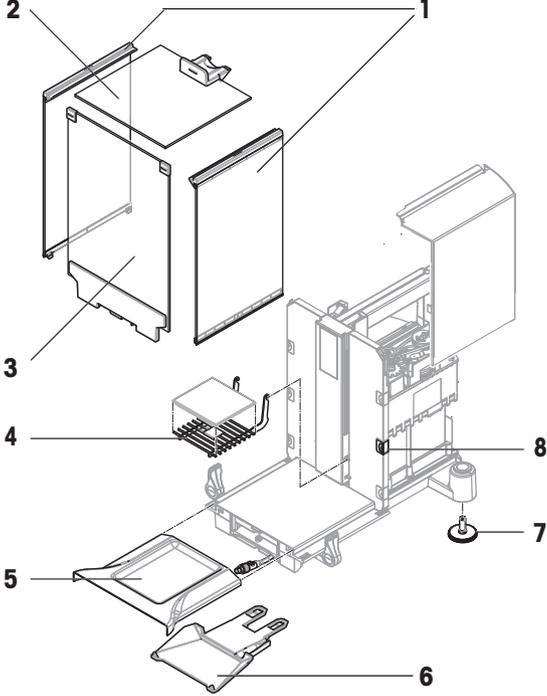
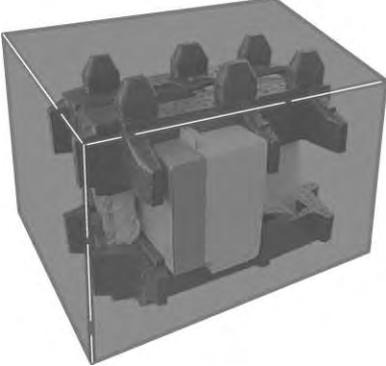
11140150



Weighing table

11138042

19.2 Spare parts

	No.	Designation	Part No.
	1	Side panel	11106841
	2	Top draft shield door	30096752
	3	Front glass panel	11106843
	4	SmartGrid	11106333
	5	Drip tray with "StaticDetect"	30067297
	6	Terminal support	30059773
	7	Foot screw	30072531
	8	Clip	11106511
		Brush	00071650
		Terminal complete with firmware	30087553
		Packaging, complete	30096766

	No.	Designation	Part No.
		Export box	30087807

20 Appendix

20.1 MT-SICS interface commands and functions

Many of the instruments and balances used have to be capable of integration in a complex computer or data acquisition system.

To enable you to integrate balances in your system in a simple manner and utilize their capabilities to the full, most balance functions are also available as appropriate commands via the data interface.

All new METTLER TOLEDO balances launched on the market support the standardized command set "METTLER TOLEDO Standard Interface Command Set" (MT-SICS). The commands available depending on the functionality of the balance.

For further information please refer to the Reference Manual MT-SICS downloadable from the Internet under

► www.mt.com/xpe-analytical

20.2 Procedure for certified balances

Preface

Certified balances are subject to the national, legal requirements of "non-automatic balances".

Switching on the balance

- **Switching on**
 - Immediately after being switched on, the balance displays 0.000.. g.
 - The balance is always started up with the "Factory setting" unit.
- **Switch-on range**
 - At maximum 20% of the type load, otherwise overload is displayed (OIML R76 4.5.1).
- **Stored value as switch-on zero point**
 - It is not permissible to use a stored value as a switch-on zero point; the MT-SICS M35 command is not available (OIML R76 T.5.2).

Display

- **Display of the weight value**
 - The "e" certification value is always shown in the display and is specified at the model designation plate (OIML R76 T.3.2.3 and 7.1.4).
 - If the display increment is lower than the "e" certification value, this is variably displayed for the net, gross and weighed tare. (Graying of the digits or certification brackets) (OIML R76 T.2.5.4 and 3.4.1).
- In accordance with guidelines, the tested display increment (certification value) is never lower than 1 mg (OIML R76 T.3.4.2).
- At balances with $d = 0.1$ mg, the digits below 1 mg are displayed in gray. These digits in brackets are printed. In accordance with legal metrology requirements, this illustration does not affect the accuracy of the weighing results.
- **Units of measurement**
 - The display and info unit are firmly set to g or mg (depending on the model).
 - The following applies for the "Custom unit":
 - No certification brackets.
 - The following names are blocked, this applies to upper and lower case letters.
 - All official units (g, kg, ct etc.).
 - c, ca, car, cm, crt, cart, kt, gr, gra, gram, grm, k, kilo, to, ton.
 - All names with "o" which can be replaced by a zero (Oz, Ozt etc.).

- **Identification of the weight display**

- Gross, net, tare and other weight values are accordingly marked (OIML R76 4.6.5).
 - Net for net when a tare value has been used.
 - B or G for gross.
 - T for the weighed tare.
 - PT for the specified tare.
 - * or diff for the difference between the net or gross.

- **Info field**

- The info weight value is handled metrologically in the same way as the weight value in the main display.

Printout (OIML R76 4.6.11)

- If a tare value is entered manually (PreTare), the PreTare value is always printed along with the net value (PT 123.45 g).
- The printed weight values are identified in the same way as the weight value on the display. I.e. N, B or G, T, PT, diff or *, with differentiation.

Example:

Single-range balance.

```
N      123.4[5] g
PT     10.00 g → for PreTare
G      133.4[5] g
```

DR balance with 100.00 g fine range.

```
N      80.4[0] g
T      22.5[6] g → for weighed tare
G      102.9[ ] g
```

Balance functions

- **Reset to zero**

- The zero range is limited to a maximum of $\pm 2\%$ of the full load (OIML R76 4.5.1).

- **Tare**

- No negative tare values are permitted.
- Tare immediate (TI) is not permitted, the MT-SICS TI command is not available (OIML R76 4.6.4).

- **1/xd**

- **e = d**

The 1/xd switchover is not permitted (OIML R76 3.1.2).

- **e = 10d**

This is only permitted in the case of the 1/10d switchover.

- **e = 100d**

Only the 1/10d and 1/100d switchover are permitted.

20.3 Recommended printer settings

English, German, French, Spanish, Italian, Polish, Czech, Hungarian

Printer		Balance	Balance/Printer				
Model	Char Set	Char Set	Baud rate	Bit/Parity	Stop bits	Handshake	End of Line
RS-P25/26/28	Ansi/Win Latin 1	Ansi/Win	9600	8/No	1	Xon/Xoff	<CR><LF> 1)

Printer		Balance	Balance/Printer				
RS-LC-P42/43/45	IBM/DOS ¹⁾	IBM/DOS	1200	8/No	1	None	<CR><LF> ¹⁾

Chinese/Japanese

Printer		Balance	Balance/Printer				
Model	Char Set	Char Set	Baud rate	Bit/Parity	Stop bits	Handshake	End of Line
RS-P25/26/28 ³⁾	Ansi/Win Latin 1	Ansi/Win	9600	8/No	1	Xon/Xoff	<CR><LF> ¹⁾
RS-LC-P42/43/45	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾

Russian

Printer		Balance	Balance/Printer				
Model	Char Set	Char Set	Baud rate	Bit/Parity	Stop bits	Handshake	End of Line
RS-P25/26/28	IBM/DOS Cyrillic	Ansi/Win	9600	8/No	1	Xon/Xoff	<CR><LF> ¹⁾
RS-LC-P42/43/45	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾	— ²⁾

Katakana

Printer		Balance	Balance/Printer				
Model	Char Set	Char Set	Baud rate	Bit/Parity	Stop bits	Handshake	End of Line
RS-P25/26/28	Ansi/Win Japanese	Ansi/Win	9600	8/No	1	Xon/Xoff	<CR><LF> ¹⁾
RS-LC-P42/43/45	Ansi/Win ¹⁾	Ansi/Win	1200	8/No	1	None	<CR><LF> ¹⁾

¹⁾ Printer settings not available.

²⁾ Required font for this language not available.

³⁾ RS-P26, possible from firmware version 2.0.

Glossary

Actual value

Weight from the weight certificate of a test weight.

Actual weight

The actual recorded weight of an external test weight. Irrespective of balance model.

Adjustment

Adjusts the balance sensitivity. For this purpose, at least one reference weight is placed on the weighing pan either manually or motorized. This is weighed and the indicated weight is stored. The sensitivity of the balance is subsequently corrected by the required amount.

Adjustment weight

External test weight for adjustment.

Calibration

Verification of the test weight with the issuance of a certificate.

Control limit

Tolerance of a process with respect to its set value. Exceeding the tolerance is a violation of quality requirements and therefore requires a correction of the process.

Eccentric load deviation

Deviation of weight indications caused by eccentric loads.

Eccentric load test

The purpose of the EC method (eccentric load test) is to ensure that every eccentric load deviation is within the necessary user SOP tolerances. The result corresponds to the highest of the 4 determined eccentric load deviations.

External adjustment weight

External test weight for adjustment.

External test weight

External test weight for testing the adjustment.

External test weight

Traceable weight for adjustment or testing.

FACT

FACT (Fully Automatic Calibration Technology) adjusts the balance based on a preselected temperature criterion fully automatically.

GWP History

History of test sequences carried out.

GWP Test Manager

List of safety functions for XS/XP balances. The balance provides active support with test requests and previously defined guided sequences.

GWP® Verification

Service providing a personalized document with precise suggestions for routine balance testing: • how should the balance be tested and how often • which weights should be used • which tolerances are appropriate

Internal adjustment weight

Built-in weight for adjustment.

Internal test weight

Built-in weight for testing the adjustment.

Internal weight

Built-in weight.

Method

A method describes the type of test to be carried out and defines the main purpose of a test sequence. The weights to be used and corresponding test or method tolerances must be defined as part of the method.

Method tolerances

Method result deviation tolerance limit.

Minimum weight

Minimum weight required for weighing with relative accuracy (MinWeigh).

ProFACT

ProFACT (Professional Fully Automatic Calibration Technology) adjusts the balance based on a preselected temperature criterion fully automatically.

Repeatability

The capability of a balance to display corresponding weights with repeated weighings of the same object in the same manner under the same conditions.

Repeatability test

Verification of the repeatability.

Result tolerances

The same as method tolerance.

Routine test

Performance of different (routine) tests for testing the balance.

Routine test

Test carried out routinely.

Sensitivity

A change in weight divided by the causal change in load.

Sensitivity test

Sensitivity verification.

Task

Tasks define when a test sequence must be carried out and how it is started and, for XP balances, who should carry out the test sequence. Before a task can be defined, the test sequence must already be defined.

Test

Collective term for testing a single function or an entire device.

Test history

Record of test results saved in a special fail-safe memory. The options in the test history allow the selection of results for documentation or printing.

Test sequence

Describes the type of test (method) and the weight with which this test must be carried out. It also defines the balance behavior if the test is not passed.

Test tolerances

Weight tolerance deviation limit for testing.

Test weight

An external weight used as a reference weight.

Testing the adjustment

According to GWP Test Manager nomenclature, corresponds to a sensitivity test.

Warning limit

An upper or lower limit, which if exceeded or not reached, makes more stringent process monitoring necessary.

Weight tolerances

a) Tolerances of certified test weights or b) Tolerances relating to a weighed weight (e.g. tare weight).

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GWP® – Good Weighing Practice™

The global weighing guideline GWP® reduces risks associated with your weighing processes and helps to

- choose the appropriate balance
- reduce costs by optimizing testing procedures
- comply with the most common regulatory requirements

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